World Food Trade and U.S. Agriculture, 1960-1982

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Foreword

World Food Trade and U.S. Agriculture, 1960-1982, is the third annual report analyzing patterns of world food trade and the impact of changes in the patterns on U.S. agriculture. The authors, Robert Wisner and Craig Chase, point out that for the second consecutive year, exports of U.S. farm products are declining. At the same time, because production of grains and oilseeds set new records in 1982-83 and because consumption grew more slowly than production, world stocks are expected to rise by 20 percent or more over those existing at the end of the previous trading year.

Farm and agribusiness sectors in the United States have expanded production and handling to meet rapidly growing markets, especially during the 1970s. For example, during this most recent decade, (1) exports have accounted for an increasing proportion of the U.S. cash receipts from farm marketing; (2) the area planted in corn, wheat, and soybeans expanded rapidly; (3) fertilizer use grew both absolutely and in amounts per acre; (4) elevator and on-farm storage capacity as well as port facilities in the United States were increased. Wisner and Chase have examined these topics and provided an update for information included in the first and second editions. They also have considered the impact of the U.S. Payment-in-Kind Program on U.S. producers and U.S. agribusinesses and the implication of this program for grain-exporting and grain-importing nations around the world.

Among current issues discussed, attention has been given to monetary and fiscal policies, trade subsidies, and the concessional as well as U.S. government-financed export programs.

The World Food Institute of Iowa State University was established in 1972 by the Iowa Board of Regents to focus the university's "competencies and leadership upon the provision of adequate and nutritious food supplies for the world's peoples through research and education." An annual report on the changing patterns of world food trade and their implications for U.S. agriculture was recommended by the Faculty Policy Committee of the World Food Institute in 1980. The purpose of the report was to disseminate a comprehensive but understandable picture of the world food situation, the role of U.S. agricultural exports in world trade, the impact of trade on U.S. agriculture, and the identification of emerging issues that would influence U.S. and world agricultural trade. It was intended to be a resource for scholars and citizens, for producers and consumers, and for policy-makers and others who are concerned with alleviating the world's food problems.

The first report on world food trade and U.S. agriculture was released in October 1981, the second in October 1982. The World Food Institute and its policy committee hope that this annual publication will continue to help readers understand the very complex interrelationships that exist among and within food-exporting and food-importing nations. We are very pleased that Dr. Wisner and Mr. Chase have been able to summarize not only large amounts of information into tables and graphs but also have provided concise comments on the signficance of the trends that have and are occurring in world food production, utilization, and trade. We welcome from readers any comments that will increase the usefulness of future editions. Those comments sent to us during this past year were greatly appreciated.

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Summary and Implications

Even with severe drought in parts of the Southern Hemisphere, world grain and oilseed production set new records in 1982-83. Global production of all grains rose approximately 3 percent above the previous season's record and was one-third larger than a decade earlier. Increased production continued the long-term upward trend in per capita world grain output. But a few key areas, such as Sub-Saharan Africa, continued to lag behind the global trend. Aggregate world grain consumption also resumed its long-term upward trend after a temporary pause in 1981-82. However, world utilization continued to fall short of production, thus bringing a sharp rise in world stocks for the second consecutive year. Ending world grain stocks in 1982-83 are expected to be equivalent to 18 percent of annual utilization—up from 12 percent two years earlier and the recent low point of 11 percent in 1975. At the current level, stocks in percent of annual utilization remain slightly below peak levels of the early 1960s.

Much of the recent increase in stocks has occurred in the United States, partly resulting from the strong U.S. dollar and the U.S. Farmer-Owned Reserve Program. Large stocks placed sharp downward pressure on U.S. grain prices until early 1983 when the Payment-in-Kind Program clearly indicated a reduction in next year's U.S. production and stocks. It appears the Payment-in-Kind Program and a U.S. drought will lead to a modest reduction in 1983-84 world grain production and stocks.

With larger production in major grain-importing nations, severe debt burdens in several developing and middle-income countries, slow world economic growth, and exchange rate changes—global grain trade declined moderately in 1982-83. Preliminary estimates place 1982-83 global grain trade at 8 percent below the previous year's record level and 5 percent less than two years earlier. This season's decline in trade is the first since 1974-75. Trade increased 9 out of 10 years during the 1970s.

Declining world trade has created an environment in which subsidies, concessional financing, price-cutting, and related trade practices are being used as individual exporting nations attempt to maintain their share of a declining total market. Trade shares of major exporters have shifted significantly during the past decade with the European Community increasing its share of world wheat, soybean meal, and beef trade. The U.S. share of world coarse grain trade rose sharply in the 1970s, as U.S. agriculture and agribusiness responded more rapidly to growing demand than its competitors. However, during the last two years, U.S. coarse grain exports have declined to approximately 60 percent of global trade, down from a peak of 71 percent in 1979-80. Government encouragement of soybean processing in Brazil, Argentina, and the European Community has contributed to a declining U.S. share of world soybean meal and oil exports. Despite moderately expanded beef exports in the past decade, U.S. beef and pork exports still account for only a small fraction of world meat trade.

While agricultural exports continue to play an important role in the U.S. economy, the current lower level of foreign demand has created serious financial stresses for American farmers and agribusiness. U.S. farm product exports in dollar value in fiscal 1982-83 (October-September) are expected to fall 12 percent below the previous year and 21 percent below the record level of 1980-81. The largest reductions in U.S. exports have occurred in corn (down an expected 20 to 22 percent in volume from 1980-81), wheat (down 15 percent in volume from the previous year's record), and coarse grains (down 24 percent in volume from the 1979-80 record). Impacts of declining trade on the U.S. agricultural sector can be better understood when viewed from the perspective of pressures to expand production and handling capacity during the previous decade. With rapidly expanding world demand and expectations of continued high inflation rate, U.S. farmers and agricultural marketing and input industries invested heavily to increase production capacity. Long-term cash-flow commitments from those investments and declining exports have created serious financial pressures in some parts of U.S. agriculture.

The recent decline in world grain trade appears likely to be temporary. In mid-1983, signs of an improving world economy were beginning to emerge. A resumption of global economic growth should bring increased demand for grains and other farm products in middle-income nations as rising consumer incomes generate increased consumption of red meat and poultry. However, a recent trend toward more restraint in monetary policy than in the 1970s and serious world debt problems appear likely to hold growth in global food trade in the near future below the unusually high rates of the 1970s.

Critical issues in world food trade for the mid-1980s include (1) monetary and fiscal policies that will promote economic growth, stable exchange rates, and easing of current debt burdens, (2) trade subsidies, (3) embargoes, (4) growing use of bilateral trade agreements, (5) food security, (6) protectionism, and (7) means of balancing production with consumption. Monetary and fiscal developments appear to be the most important factors behind the recent decline in trade, and hence appear likely to offer the greatest potential for trade expansion in the years just ahead. Bilateral trade agreements and protectionist policies of importers appear to shift more of the adjustment from changing world supplies to countries that have relatively free trade. For that reason, widespread use of such policies may offer disadvantages for U.S. agriculture. To some participants in world trade, subsidies appear to be a useful tool for maintaining or expanding an individual nation's trade share. However, aggressive use of such policies carries with it the danger of a global trade war in which major exporters use increasingly large subsidies to maintain their shares of a declining total market. And finally, despite increased world grain stocks, food security remains an important policy issue for peoples of the developing world. Rising 1982-83 world stocks only are equivalent to minimum safe levels needed for global food security, according to some world food authorities. However, stocks are but one of several possible dimensions of world food security policy.

Introduction

Exports of U.S. farm products are declining this season for the second consecutive year. This news brought shock waves across the U.S. agricultural sector in 1982 and early 1983. While export earnings remain huge in comparison with a decade ago, the recent decline has had major impacts on U.S. net farm income, farm supply industries, grain transportation and handling firms, and U.S. workers normally employed in these and related industries. Recent projections indicate U.S. agricultural exports in the 1982-83 fiscal year (October-September) will total $34.5 billion. That represents a 12 percent decline from the previous fiscal year and a 21 percent drop from the peak level in 1980-81.[1]

With one out of every three U.S. harvested acres normally producing for export markets and with nearly one-third of U.S. farmers' cash receipts depending on export earnings, the impact on agriculture has been substantial. Its impact can best be understood by observing that the U.S. farm and agribusiness sectors had been severely challenged in the 1970s in their efforts to meet rapidly expanding world demand. With the challenges of the past decade, the entire production and marketing system had been geared toward rapidly expanding production and handling capability. Considerable difficulty is now being experienced in adjusting excess capacity to a lower level of world demand.

U.S. agricultural imports in the 1982-83 fiscal year are expected to total about $16.2 billion. That is an increase of 6 percent from the previous year but a 6 percent decline from the 1980-81 record.[2]

Despite the lower level of agricultural trade and smaller net trade balance, farm product exports are still a major source of foreign exchange earnings, which help to pay for U.S. imports of automobiles, petroleum, steel, appliances, and other items imported by nonagricultural sectors. Along with foreign trade earnings, farm product exports also help support the U.S. dollar in foreign exchange markets. Without large agricultural exports, the U.S. balance of international payments would be less favorable and the U.S. dollar almost certainly would be valued at a lower level in world currency markets than at present. A weaker dollar would raise the costs of industrial and consumer product imports, thus making these products more expensive for U.S. consumers and tending to lower Americans' standard of living.

With U.S. agriculture heavily dependent on foreign markets, it is important to identify the causes of the recent decline in U.S. and world food trade and key developments that will influence trade patterns in the years immediately ahead. Does the drop in U.S. farm product exports reflect more aggressive trade policies of other nations? Is it caused by sharply expanded foreign grain and oilseed production? Are previous U.S. trade embargoes a major factor? To what extent is the world trade situation being influenced by a sluggish world economy? Is progress being made in improving dietary levels of the average world citizen? This report is intended to provide answers for these and other critical questions facing U.S. and world agriculture in the early 1980s. It also examines several emerging policy developments including the U.S. Payment-in-Kind Program to reduce crop production, the use of export subsidies to gain an expanded share of world markets, and the proliferation of bilateral agreements in world grain trade.

1982-83 World Food Situation: Ample Supplies, Larger Stocks

Despite severe droughts in parts of the Southern Hemisphere and less than ideal weather in the Soviet Union, world grain and oilseed production set new records in 1982-83. World grain consumption is continuing its long-term upward trend, but at a much slower rate of growth than in the late 1970s. With slower growth of consumption, combined world stocks of all grains are expected to rise to 259 million metric tons by the end of the 1982-83 trade year, up 18 percent from a year earlier and nearly twice as large as the recent low point in stocks in 1974-75. Rising world stocks placed sharp downward pressure on world feed grain and oilseed prices in late 1982. But by spring 1983, world feed grain prices had recovered to the highest level since early 1981. These higher prices were caused by heavy farmer participation in the U.S. Payment-in-Kind and U.S. Grain Reserve programs. The Grain Reserve Program removes excess old-crop supplies from market channels, while the Payment-in-Kind Program pays farmers grain in return for substantially reducing their 1983 plantings of major crops. The Payment-in-Kind Program and a U.S. drought may reduce 1983 world grain production modestly, but with large carryover stocks aggregate world supplies are expected to be fully adequate to meet market demand.

World Grain Trade Down

World grain trade this year is highlighted by several major developments including (1) a sharp decline in total Soviet coarse grain (feed grain) imports, (2) major shifts in shares of world trade among wheat-exporting nations, (3) increased production in several grain-importing nations, and (4) a decline in aggregate world grain trade to the lowest level since 1979-80. Growth in world grain utilization has been slowed by the global economic recession and severe debt-servicing problems in Eastern Europe, Mexico, and certain other developing nations. While the world economy is expected to improve modestly in the years immediately ahead, debt burdens of several importers may continue to hold the growth rate of world grain utilization below the unusually high rates of the late 1970s and may temper the expansion in world grain trade in the next few years.

Despite a decline in world coarse grain trade, U.S. corn exports have been supported in the 1982-83 trade year by drought-reduced supplies in South Africa, Australia, and Argentina. With reduced competition from these exporters, the U.S. share of world coarse grain trade is expected to increase slightly in 1982-83. However, the opposite situation is true in wheat. Strong competition from Canada, Argentina, and other wheat exporters is expected to push the U.S. share of world wheat trade sharply below a year earlier. In contrast to coarse grain and wheat, U.S. soybean exports are at near-record levels in the 1982-83 marketing year. Global demand for soybeans and other higher protein oilseeds has been supported by (1) the Soviet Union's increased emphasis on protein in livestock and poultry rations, (2) high cereal prices in the European Community which encourage the use of soybean meal as a cereal substitute, and (3) modest economic growth in Japan, Korea, and Taiwan which has generated additional demand for oilseed products. U.S. shares of world soybean and soybean meal trade are expected to increase slightly this year, while the U.S. share of global soybean oil exports will likely remain near the 1981-82 level. In the years immediately ahead, an improving world economy and increased Soviet emphasis on protein meal in livestock production should bring modestly increased world trade in oilseeds and oilseed meals. However, financial restraints on the world economy may hold trade expansion below the explosive growth rates of the 1970s.

Table 1. Combined World Supplies, Utilization, Trade, and Stocks of All Grains in 1982-83 and Selected Recent Years in Millions of Metric Tons.[a]

July-June Trade Years	Production	Utilization	Trade	Ending Stocks[b]	Stocks as % of Utilization
Proj.					
1983-84	1,505	1,531	205	233	15.3
1982-83	1,543	1,503	199	259	17.3
1981-82	1,492	1,453	218	220	15.2
1980-81	1,440	1,457	213	180	12.4
1979-80	1,419	1,443	200	197	13.7
1978-79	1,461	1,434	174	220	15.4
1976-77	1,360	1,307	157	195	15.0
1971-72	1,194	1,176	110	183	15.6
1966-67	1,005	979	104	169	17.3
1960-61	845	831	72	200	24.0

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 21-83 (Washington, D.C.), July 14, 1983. Includes wheat, milled rice, and coarse grains.

[b]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

World Grain Supplies, Utilization, Trade, and Stocks

Table 1 and figure 1 illustrate trends in the world supply-demand situation for all grains in 1982-83 along with comparisons for recent years. World grain production (including wheat, coarse grains, and rice) rose to an estimated 1.543 billion metric tons in 1982-83, up 3.4 percent from the previous year's record level and up 5.5 percent from four years earlier. As an indicator of longer term progress in the world food situation, 1982-83 production is estimated to be 29 percent greater than in 1971-72 and is up about 82 pecent from the early 1960s. The record production reflects record yields per hectare in North America and Europe. However, harvested areas are estimated to have declined 2.2 percent from the previous year.

World grain utilization is expected to be a record 1.50 billion metric tons, 3.0 percent above the previous year. Utilization at this level represents a significant acceleration from the 0.4 percent average growth rate of the previous three years. About one-fourth of this season's global increase in grain utilization is accounted for by the Soviet Union and China. An additional 12 percent of the growth reflects increased U.S. feeding and industrial use of corn.

Despite record world grain utilization, global grain exports in 1982-83 declined for the first time since 1974-75. About two-thirds of the decline in trade was accounted for by the decline in Soviet grain imports. Grain imports of non-Soviet nations as a group declined only slightly from the previous year's level. World grain trade declined only six times in the previous 21 years, with five of those occurring in the 1960s. Thus, the current slowdown in world grain trade is a striking departure from the export pattern of the 1970s.

World grain stocks in millions of metric tons at the end of the 1982-83 trade year are expected to set a new record, 18 percent above the previous high a year earlier. However, a more appropriate way of examining stocks is as a percentage of annual utilization. When measured by this standard, world grain stocks remain modestly below levels of the early 1960s (see figure 1). Ending 1983 world carryover stocks are projected at 17.3 percent of annual utilization or equivalent to about 63 days' requirements. That is an increase from 1982 stocks, which were 15.2 percent of annual utilization or 55 days' requirements. Nearly all the build-up of world grain carryover stocks in the last few years has occurred in the U.S. and has severely affected U.S. prices for wheat and corn.

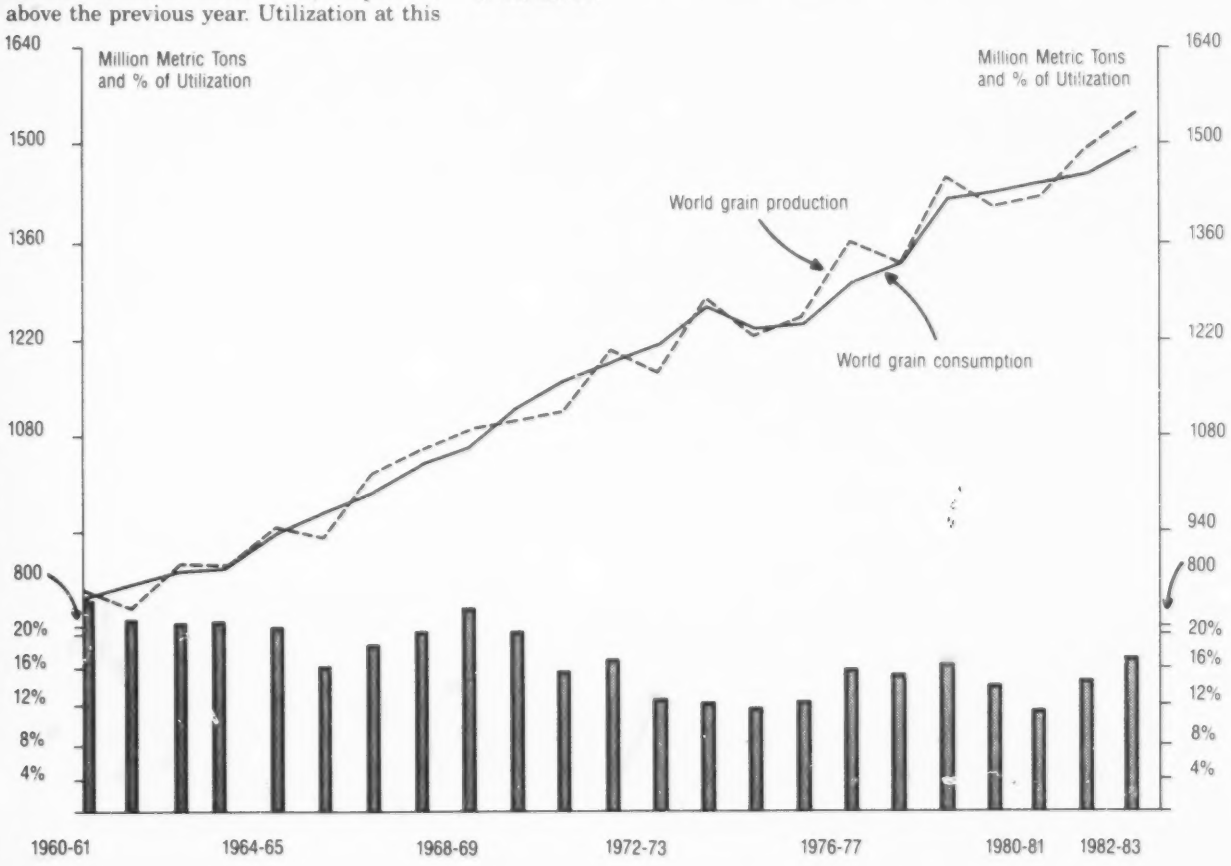


Figure 1. World Grain Production and Consumption in Millions of Metric Tons, and Carryover Stocks as Percentage of Annual Consumption, July-June, 1960-61 to 1982-83.

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 13-83 (Washington, D.C.), May 12, 1983 and various other issues.

1982-83 World Grain Trade Sharply Below Long-Term Trend

Combined world trade in feed and food grains in 1982-83 has dropped well below the long-term growth trend of the previous two decades, as shown in table 2. During the 1970s, world trade in grains accelerated strongly with the emergence of Russia and Eastern Europe as major importers along with substantial economic growth in other nations. In the decade of the 1970s, world grain trade grew by an average of 10.2 million metric tons per year, up from an average annual growth of only 3.7 million metric tons in the preceeding decade. Global grain trade expanded in nine out of 10 years during the 1970s, compared with increases in five out of 10 years during the 1960s.

To put the decline in perspective, this year's decrease in world exports is equivalent to 9 percent of the current annual U.S. wheat and corn exports. If similar declines should continue in the next two years with most of the reduction in trade being absorbed by the United States, American corn and wheat exports could be cut nearly in half from the 1981-82 levels. However, this prospect seems unlikely because of an expected modest recovery in the world economy and continued crop production problems in the Soviet Union. Instead, modestly higher world grain exports seem more likely in the next few years. To fully utilize the U.S. grain production capacity under normal weather conditions, world grain trade would probably need to increase for at least two or three consecutive years at the same rate at which it has declined in 1982-83—with little or no increase in production of other major grain-exporting nations. Because world grain trade has increased this sharply only two times in the last 22 years, the probability of its occurrence for three consecutive years seems low. Consequently—barring widespread adverse weather—production control programs may continue to be required in the next few years to curtail rising grain carryover stocks in major exporting nations.

World Wheat Supplies, Utilization, and Reserves

World wheat production in 1982-83 is estimated at a record 480 million metric tons, 7 percent above the previous year's record and 7.5 percent above an earlier high in 1978-79 (see table 3). From a longer term perspective, world wheat production this year is 37 percent above the 1971-72 level and double 1960-61 production. Growth in wheat utilization in 1982-83 is lagging slightly behind production, resulting in increased carryover stocks for the second consecutive year. World wheat stocks in millions of tons are approaching the 1978-79 record. Ending 1982-83 stocks are expected to be equivalent to 21.1 percent of annual utilization or approximately 77 days' requirements. In 1960-61, world wheat carryover stocks were equivalent to 123 days' requirements. Thus, while world wheat stocks are approaching a record level in bushels or tons, they remain well below previous records when expressed in percentage of annual requirements.

Table 2. Annual Change in Total World Grain Trade, 1961-62 through 1982-83 in Millions of Metric Tons.*

Marketing Year	Change from Previous Year in Total Trade	Marketing Year	Change from Previous Year in Total Trade
1961-62	+10.8	1971-72	+ 0.2
1962-63	− 0.5	1972-73	+24.7
1963-64	+15.0	1973-74	+ 7.1
1964-65	− 2.4	1974-75	− 5.0
1965-66	+15.6	1975-76	+13.5
1966-67	− 7.2	1976-77	+ 6.5
1967-68	− 6.6	1977-78	+ 9.7
1968-69	− 7.6	1978-79	+ 7.8
1969-70	+ 7.7	1979-80	+25.0
1970-71	+12.3	1980-81	+12.4
Ave. Yearly Change	+ 3.7	Ave. Yearly Change	+10.2
		1981-82	+ 4.8
		Prelim. 1982-83	− 8.7
		Project. 1983-84	+ 3.0

*Source: Compiled from U.S. Department of Agriculture, Foreign Agriculture Service, *Foreign Agriculture Circular, Grains*, FG 21-83 (Washington, D.C.), July 14, 1983.

Table 3. World Wheat Production, Utilization, Trade, and Carryover Stocks in Millions of Metric Tons in 1982-83 and Selected Recent Years.[a]

Trade Years	Production	Utilization	U.S. Exports	Non-U.S. Exports	Total Trade	Ending Stocks[b]	Stocks as % of Utilization
Prelim. Est.							
1983-84	478.4	466.8	38.1	60.5	98.6	109.0	23.6
1982-83	480.3	468.3	40.0	57.7	97.7	97.4	21.1
1981-82	448.9	442.1	49.1	52.6	101.7	85.5	19.5
1980-81	442.0	446.8	41.9	52.2	94.1	76.1	17.1
1979-80	423.3	443.8	37.2	48.8	86.0	80.4	18.3
1978-79	446.8	430.2	32.3	39.7	72.0	100.9	23.8
1976-77	421.3	385.8	25.8	37.5	63.3	99.8	26.2
1971-72	350.9	344.2	16.6	35.4	52.0	81.0	23.5
1966-67	306.8	279.9	20.3	35.7	56.0	82.1	29.4
1960-61	238.4	234.8	19.6	22.4	41.9	81.8	34.8

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular, Grains*, FG 21-83 (Washington, D.C.), July 14, 1983. Includes wheat and wheat products.

[b]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

Table 4. Wheat Exports by Major Non-U.S. Exporters, July-June 1982-83 and Comparisons with Recent Years in Millions of Metric Tons.[a]

	1978-79	1979-80	1980-81	1981-82	Est. 1982-83	Project 1983-84	% Chg. from 1981
Canada	13.5	15.0	17.0	17.8	21.0	21.5	+18
Australia	6.7	14.9	10.6	11.0	8.0	11.0	−27
Argentina	3.3	4.8	3.9	4.3	7.5	8.0	+74
European Comm.	8.8	10.4	14.7	15.5	15.5	15.5	0
Total	39.7	48.8	53.0	54.0	59.5	60.3	+10

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 21-83 (Washington, D.C.), July 14, 1983.

U.S. wheat exports in 1982-83 dropped about 19 percent below last season's record, to approximately the same level as in 1980-81. Exports at this level were about 59 percent larger than six years earlier. Non-U.S. wheat exports have surged to a new record this season, up 10 percent from a year earlier and up 54 percent from six years earlier. Total world trade in wheat and wheat products has declined slightly in 1982-83 for the first time since 1978-79.

Table 4 shows estimated 1982-83 wheat exports by major non-U.S. exporters and comparisons with recent years. Except for Australia and the European Community, most exporters have increased their wheat shipments sharply above the previous year. The most dramatic increase occurred in Argentina, where favorable weather and increased plantings boosted wheat exports to approximately double the average level of the preceeding four years. Australia's 1982-83 wheat exports have been restrained by a severe drought. Early indications are that 1983-84 planted wheat area will rise moderately in Canada and Australia. With favorable weather, exports from those areas could increase again in the year ahead.

World Coarse Grain Supplies, Utilization, and Reserves

World coarse grain production surged upward to a new record in 1982-83 for the second consecutive year. Available supplies, utilization, and trade this season and comparison with previous years are shown in table 5. Global production in 1982-83 is placed at 781 million metric tons, 2.1 percent above a year earlier and 4 percent above an earlier high in 1978-79. Long-term growth of world coarse grain production has lagged well behind wheat, with this year's world production up 24 percent from 1971-72 and up 74 percent from 1960-61. More rapid growth of wheat production probably reflects its adaptation to a wider range of climatic conditions, lower fertilizer requirements per acre than corn, and the extensive development of higher-yielding wheat varieties in the last two decades.

After declining in 1981-82, world coarse grain utilization is increasing by about 2 percent this season and is estimated to be equal to the record level of four years earlier. Slow growth of utilization in recent years reflects the sluggish world economy, slower growth in consumer demand for meat and other livestock products, and a leveling off of world livestock inventories.

Global coarse grain exports declined in 1982-83 for the second time in eight years. The decline reflects ample domestic grain supplies in much of Western Europe, and increased coarse grain supplies and sharply reduced imports by the Soviet Union. U.S. coarse grain exports are expected to decline slightly less in 1982-83 than those of all other exporters as a group. Serious droughts in several feed grain-exporting nations including Australia, Argentina, and South Africa, have reduced available supplies of non-U.S. exporters this season.

World coarse grain stocks at the end of 1982-83 in absolute terms are expected to exceed the highs of the early 1960s. However, when expressed as a percentage of annual utilization, stocks are modestly below the 1960-61 level. Ending 1982-83 world stocks are expected to be equivalent to about 71 days' utilization, up from only 40 days' utilization two years earlier.

Table 6 shows ending U.S. and non-U.S. carryover stocks of coarse grains since 1969-70 and projections for 1982-83. It is clear that the U.S. traditionally has carried most of the world's reserve coarse grain stocks, and that is especially true in 1982-83. Non-U.S. carryover stocks have fluctuated in a remarkably narrow

Table 5. World Coarse Grain Production, Utilization, Trade, and Carryover Stocks in Millions of Metric Tons in 1982-83 and Selected Recent Years.[a]

July-June Trade Years	Production	Utilization	U.S. Exports	Non-U.S. Exports	Total Trade	Ending Stocks[b]	Stocks as % of Utilization
Prelim. Est.							
1983-84	743.0	779.5	58.1	36.2	94.3	109.4	14.1
1982-83	780.9	748.3	52.5	36.0	88.5	145.8	19.3
1981-82	764.8	732.4	61.4	42.8	104.2	113.3	15.4
1980-81	730.9	741.4	72.4	33.3	105.7	82.0	11.2
1979-80	741.3	740.9	71.6	28.7	100.4	91.6	12.3
1978-79	753.6	748.1	56.9	33.5	90.4	91.2	12.2
1976-77	704.2	685.3	50.6	32.1	82.7	77.5	11.3
1971-72	629.1	615.4	24.6	24.4	49.0	87.0	14.2
1966-67	521.2	520.2	20.0	20.0	40.0	76.1	14.6
1960-61	447.9	437.2	15.7	8.3	24.0	109.7	25.1

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular, Grains*, FG 21-83 (Washington, D.C.), July 14, 1983; FG 1-82 (Washington, D.C.), January 20, 1982; FG 29-82 (Washington, D.C.), September 15, 1982; and FG 12-73 (Washington, D.C.), October 26, 1973.

[b]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

range—from 38.2 million metric tons in 1972-73 to 47.5 million metric tons in 1976-77. Meanwhile, U.S. stocks have been much more variable and have fluctuated from a low of 15.5 million tons in 1974-75 to an expected high of 106 million tons in 1982-83. The U.S. share of world coarse grain stocks has ranged from 26.3 percent in the mid-1970s to an expected high of over 70 percent this season. The recent sharp rise in the U.S. share of world stocks reflects record 1982 U.S. production and the U.S. Farmer-Owned Grain Reserve, which has provided substantial monetary incentives for farmers who store excess supplies for three to five years. The Farmer-Owned Reserve is now being de-emphasized and U.S. shares of world coarse grain stocks are expected to decline in the coming year.

Recent coarse grain exports by major non-U.S. exporters are shown in table 7. Combined exports by this group in 1982-83 are expected to be down 18 percent from the previous year but are about 23 percent above the 1979-80 level. Weather in many of these nations tends to be more variable from year to year than in the U.S. grain belt and causes substantial year-to-year fluctuations in their coarse grain exports. For example, non-U.S. coarse grain exports in 1981-82 were boosted by favorable weather in Argentina, Australia, and South Africa. However, 1982-83 exports from these same countries are being curtailed by severe drought that occurred from mid-1982 through early 1983. Early indications are that exports from these nations as a group may increase at least slightly in the latter part of the 1983-84 trade year because of an improving moisture situation. However, export volumes through the first quarter of 1984 will come mainly from the drought-reduced spring 1983 harvest and will almost certainly be well below a year earlier.

Table 6. U.S. and World Ending Coarse Grain Carryover Stocks, 1969-70 to 1982-83 in Millions of Metric Tons.[a]

Marketing Year	Coarse Grain Carryover Stocks[b]			U.S. Stocks as a Percentage of World Carryover
	World	Non-U.S.	U.S.	
Proj. Est.				
1983-84	109.4	38.2	71.2	65.1
1982-83	145.8	39.8	106.0	72.7
1981-82	113.3	42.1	71.2	62.8
1980-81	82.0	45.8	36.2	44.1
1979-80	92.6	39.9	52.7	56.9
1978-79	91.2	44.8	46.4	50.9
1977-78	85.9	44.4	41.5	48.3
1976-77	77.5	47.5	30.0	38.7
1975-76	58.3	41.0	17.3	29.7
1974-75	58.9	43.4	15.5	26.3
1973-74	65.9	44.1	21.8	33.1
1972-73	69.9	38.2	31.7	45.4
1971-72	87.0	40.4	46.6	53.6
1970-71	72.2	40.0	32.2	44.6
1969-70	89.2	43.1	46.1	51.7

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 21-83 (Washington, D.C.), July 14, 1983.

[b]Does not include stocks for Soviet Union, China, and certain other centrally planned countries due to lack of published data. Reported total stocks are an aggregate of different marketing years for various countries and thus do not represent inventory levels at a single point in time.

Table 7. Coarse Grain Exports by Major Non-U.S. Exporters, July-June 1982-83 and Comparisons With Recent Years in Millions of Metric Tons.[a]

	1978-79	1979-80	1980-81	1981-82	Est. 1982-83	Proj. 1983-84	% Chg. from 1981-82
Canada	3.9	4.8	4.6	7.6	6.2	6.4	−18
Australia	2.6	4.1	2.2	3.4	1.3	2.5	−62
Argentina	11.5	6.6	9.9	13.6	10.8	12.2	−21
S. Africa	2.9	2.9	3.6	4.9	3.3	0.5	−33
Thailand	2.3	2.3	2.4	3.5	2.4	2.9	−31
W. Europe	6.2	5.6	7.0	5.9	6.3	6.9	− 7
Other	4.0	2.9	3.4	5.1	5.8	4.7	+14
Total	33.3	29.3	33.1	44.0	36.1	36.1	−18

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 21-83 (Washington, D.C.), July 21, 1983; and FG 1-83 (Washington, D.C.), January 17, 1983.

World Rice Supplies, Utilization, and Trade

World demand for wheat is influenced to some extent by rice because both crops ar food grains. In contrast to wheat and coarse grains, world rice exports are up modestly in 1982-83 and world stocks as a percent of annual utilization are expected to fall to about the level of the mid 1960s. World production in 1982-83 increased about 1 percent from 1981-82, and was 31 percent above 1971-72 and 92 percent larger than in 1961-62. Thus, world rice production has increased substantially in the last two decades. The slight increase in this season's world production reflects a sharply lower rice crop in India (down 16 percent in the previous year) and smaller declines in Brazil and the United States which were offset by larger crops in China, Indonesia, and Bangladesh.

U.S. rice exports are expected to fall about one-fourth below the 1980-81 record as a result of strong competition from other exporters. Even though the United States accounts for less than 2 percent of the world's rice production, it is expected to maintain its recent position as the second-ranking exporter of rice. The United States normally accounts for about one ton out of every five traded in world markets. Thailand usually is the world's leading rice exporter; this year, it is expected to account for approximately 27 percent of global rice exports.

World Soybean and Oilseed Situation in 1982-83

World production of oilseeds rose to a record 98.2 million metric tons in 1982-83 in 44 percent protein meal equivalent. That is an increase of 8 percent from a year earlier and is 77 percent greater than 11 years earlier. This year's increase stems largely from a larger 1982 soybean crop in the U.S. and increased spring 1983 production in Brazil. The latter country's 1982 harvest had been reduced moderately by drought, and the larger 1983 crop reflects slightly improved growing conditions.

World fat and oil production also has increased modestly this season. Global

Table 8. World Milled Rice Production, Utilization, Trade, and Carryover Stocks in Millions of Metric Tons in 1982-83 and Selected Recent Years.*

July-June Trade Years	Production	Utilization	U.S. Exports†	Non-U.S. Exports†	Total Trade†	Ending Stocks‡	Stocks as % of Utilization
Proj. 1983-84	283.1	284.6	2.2	9.7	11.9	14.5	5.1
Est. 1982-83	281.4	286.7	2.3	10.3	12.6	16.0	5.6
1981-82	277.8	278.7	2.5	9.1	11.6	21.3	7.6
1980-81	267.2	268.4	3.0	9.9	12.9	22.2	8.3
1979-80	254.2	258.6	3.0	9.6	12.6	23.4	9.0
1978-79	262.1	255.6	2.3	9.3	11.6	27.8	10.9
1976-77	234.6	234.6	2.1	8.4	10.5	17.8	7.6
1971-72	214.1	214.1	1.8	6.9	8.7	15.3	7.1
1966-67	177.4	177.4	1.7	6.1	7.8	10.6	6.0
1961-62	146.2	146.7	0.9	5.4	6.3	7.1	4.8

*Source: U.S. Department of Agriculture, Foreign Agriculture Service, *Foreign Agriculture Circular, Grains*, FG 21-83 (Washington, D.C.), July 14, 1983; FG 1-83 (Washington, D.C.), January 17, 1983; FG 18-78 (Washington, D.C.), November 13, 1978; and FG 12-73 (Washington, D.C.), October 26, 1973.

‡Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

†Exports are computated on a calendar year basis.

production is tentatively projected to be 6 percent above the previous year and 7.4 percent above 1979-80. Increases this year stem from larger U.S. and Brazilian soybean crops, expanded palm oil production in Malaysia, increased rapeseed production in Europe and other areas, and larger sunflower seed production in North America. Malaysian palm oil output has been boosted sharply by the introduction of a weevil that aids pollination. From a longer term perspective, world fat and oil production has expanded much less rapidly than has been the case with soybean meal. Fat and oil output in 1982-83 is expected to be 52 percent larger than in 1971-72, slightly more than half the growth rate of protein meal production. However, fat and oil demand also has grown much more slowly than the demand for protein meal. Increased world consumption of protein meals reflects a long-term growth of consumer incomes and expanded demand for livestock and poultry products, as dietary patterns shift from cereals to greater emphasis on protein meal. Efficient livestock and poultry production requires substantial use of protein meals, thus boosting the demand for protein meal. Conversely, fats and oils are used primarily for direct human consumption as cooking oils, salad oils, and table spreads, such as butter and margarine. In industrial and middle income nations, consumption of these products has been much less sensitive to income growth than has the demand for meat. Disparity in growth rates of oil and protein demand has caused soybean meal to carry a larger than normal portion of the value of soybeans, thus holding meal demand growth below levels that would have occurred with stronger world demand for fats and oils.

World soybean meal imports in 1982-83 expanded about 4 percent above the previous year's level. The largest increases occurred in the European Community and the Soviet Union, along with moderate increases in Mexico, Japan, Korea, Taiwan, and Spain. World soybean stocks by late 1983 are expected to be modestly above the previous year but represent a smaller percentage of annual consumption than either food grains or coarse grains. Early indications are that global soybean carryover stocks will be equivalent to only slightly over two months' utilization.

Table 9. World, U.S. and Foreign Production of Oilseed Products in 1971-72, 1979-80, 1981-82, and 1982-83 in Millions of Metric Tons.*

	44% Protein Meal Equivalent					Fat and Oil Production				
	1971-72	1979-80	1981-82	Prelim. 1982-83	% Change 1971-83	1971-72	1979-80	1981-82	Prelim. 1982-83	% Change 1971-83
U.S.	25.2	50.0	44.3	49.5	+96	9.3	16.3	14.8	15.9	+52
Non-U.S.	30.3	45.1	46.5	48.7	+61	28.1	36.7	38.9	40.8	+34
World Total	55.5	95.1	90.8	98.2	+77	37.4	53.0	53.7	56.7	+52

*Source: U.S. Department of Agriculture, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 6-83 (Washington, D.C.), June 1983, and FOP 16-78 (Washington, D.C.), November 1978.

Tentative production prospects in mid-1983 pointed to some decline in global soybean and oilseed production. The decline is expected to occur mainly in the United States, where the Payment-in-Kind Program is reducing the amount of wheat area available for double-cropping with soybeans. Lower than normal oilseed prices in relation to corn and other grains also are encouraging farmers outside U.S. government programs to shift land from the former to the latter crops. Thus, world oilseed supplies may tighten some in the year ahead and a reduction in world carryover stocks of soybeans and other oilseeds is likely by late summer 1984.

Figures 2 and 3 show the sources of expanded world protein meal and oil production since the mid-1960s. Most of the growth in world protein supplies has come from expanded soybean production. However, in the edible and inedible oils sector, production growth has been shared with palm oil, sunflower oil, and a number of other products. Soybeans are the dominant source of protein meal in world livestock and poultry production but represent less than one-fourth of the world's supply of edible and inedible oils.

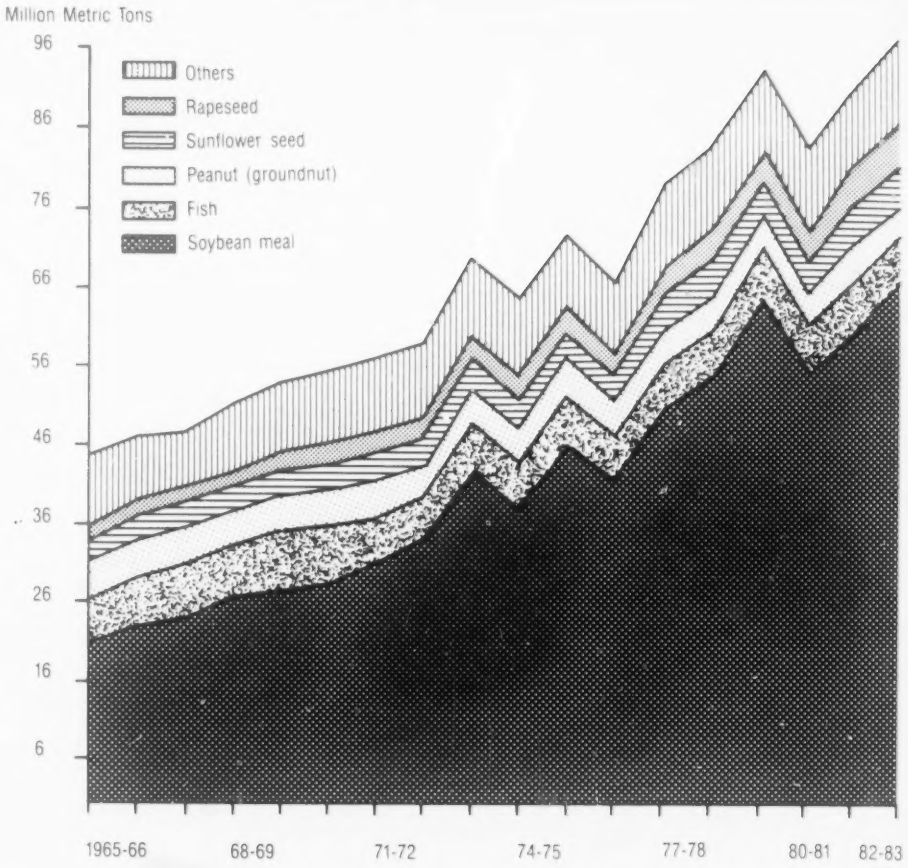


Figure 2. World Protein Meal Production by Type of Product, 1965-1983.

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-83 (Washington, D.C.), April 1983 and various other issues.

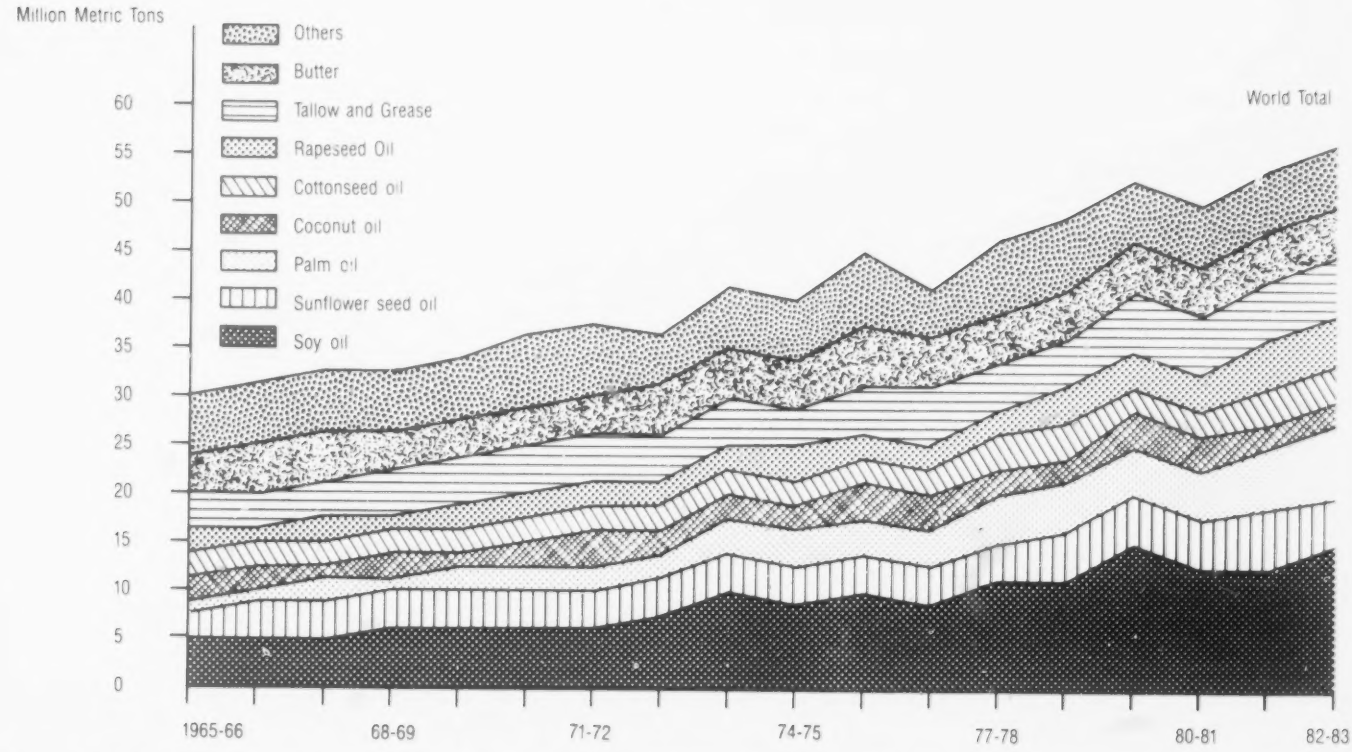


Figure 3. World Edible and Inedible Oil Production by Type of Product, 1966-1983.

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-83 (Washington, D.C.), April 1983 and various other issues.

World Area Devoted to Grain and Oilseed Production

The upward trend in world grain and oilseed production in the past two decades reflects both an increase in area harvested and higher yields per hectare. The upward trend of yields continued in the 1982-83 trade year, with world average yields for wheat and coarse grains setting new records. The world average wheat yield at 2.03 tons per hectare rose 4 percent above the 1978-79 record. As data in table 10 indicate, average yields for wheat, rice, and coarse grains have risen 20 to 24 percent since 1971-72. Wheat and rice area harvested is now about one-tenth larger than 11 years ago, while the world coarse grain area harvested increased only about 3 percent during the same period. Thus, food grain production has grown more rapidly than coarse grain production in the last decade.

Future increases in world cropland area will likely occur more slowly than in the 1970s. Large land areas still are available for conversion to crop production in Brazil and Argentina. However, substantial costs for land clearing, transportation systems, and other supporting services will restrict land development in those areas unless economic incentives are substantial. Some additional land also is available for cropping in North America, but its conversion to cropland will be restricted by location, erosion hazards, drainage problems, and other limitations. Additional land is available for crop production in the Soviet Union, although climatic limitations and other factors will keep development costs high in that area.

Future increases in yields per hectare will depend on (1) broader use of currently available technology, (2) development and application of new technology, and (3) no major change in the world's climate.

Developments so far point to a continuation of the upward trend in yields for the years immediately ahead, with year-to-year fluctuations as a result of weather. But with a slower growth in the cropland base, world grain production in the next few years could increase more slowly than in the last two decades.

Grain Area Harvested in Selected Exporting Regions

Much of the expansion in coarse grain area harvested in exporting nations during the last decade has been in the United States, as shown in table 11. Coarse grain area expanded slightly in Western Europe in the mid-1970s—at the expense of wheat. However, by 1981-82 West European coarse grain area had declined to approximately the same level as at the beginning of the previous decade. Southern Hemisphere area harvested varies slightly from year to year as a result of the variable rainfall in that part of the world. Argentine coarse grain area in 1982-83, while up from the mid-1970s, remained modestly below the level of 12 years earlier. Smaller coarse grain area there was offset by expanded wheat plantings. In Australia, both wheat and coarse grain area harvested trended upward during the decade, but declined modestly in 1982-83 because of widespread severe drought. South African coarse grain area declined while wheat area remained approximately constant during the decade. Canadian grain plantings followed the U.S. trend, with a modest increase in coarse grain area and a sharp increase in harvested wheat area. U.S. wheat area harvested rose by 85 percent during the 12-year period along with a 147 percent rise in Canadian wheat area. Coarse grain area expanded by slightly less than 10 percent in both countries during the same period. The greater expansion in wheat area reflects wheat prices that were above normal relative to feed grains, the return of fallow land to production, and some conversion of pasture and forage land to wheat production.

Harvested Soybean Area in Major Producing Countries

Harvested soybean area in major producing nations expanded by 84 percent between 1970-71 and 1982-83, as shown in table 12. China was the only major producer showing no major increase in soybean area in the 12-year period; all others sharply expanded the cropland area devoted to soybean production. However, total soybean area in major producing countries has nearly stabilized in the last three years. During the 12-year period, increased U.S. harvested soybean area accounted for 54 percent of the total expansion in area of major producers. The United States accounts for about three-fifths of the world's total area of soybeans harvested.

Table 10. World Yields in Metric Tons Per Hectare, and Harvested Area Devoted to Grains and Major Oilseeds, 1982-83 and Comparisons with Recent Years.[a]

July-June Years	Wheat		Rice		Coarse Grains		Oilseeds	
	Tons/ Hectare	Mil. Hectares	Tons/ Hectare	Mil. Hectares	Tons/ Hectare	Mil. Hectares	Tons/ Hectare	Mil. Hectares
1961-62	1.10	203.4	1.86	115.7	1.35	322.4	[b]	[b]
1971-72	1.65	212.9	2.35	134.9	1.86	333.4	[b]	[b]
1976-77	1.81	233.2	2.46	141.7	2.05	343.7	1.08[c]	122.6[c]
1980-81	1.86	236.5	2.76	144.5	2.14	341.5	1.17	127.6
1981-82	1.88	238.2	2.85	145.2	2.20	347.8	1.25	130.7
Prelim. 1982-83	2.03	235.1	2.83	142.8	2.30	341.7	1.29	134.1
% Chg. from 1971-72	+22	+10	+20	+6	+24	+2	[b]	[b]

[a]Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 4-83 (Washington, D.C.), February 15, 1983; *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-83 (Washington, D.C.), April 1983, and FOP 20-79 (Washington, D.C.), October 1979.

[b]Data are not available for these years.

[c]1972-83 through 1976-77 averages.

Table 11. Wheat and Coarse Grain Area Harvested in Millions of Hectares by Selected Grain Exporters, 1982-83 and Comparisons with Recent Years.[a]

Area or Country	Coarse Grains					Wheat				
	1970-71	1975-76	1978-79	1981-82	Prelim. 1982-83	1970-71	1975-76	1978-79	1981-82	Prelim. 1982-83
Western Europe	24.0	25.2	25.3	24.4	24.0	17.0	15.4	15.9	16.4	16.7
Canada	8.4	8.6	7.8	9.2	8.9	5.1	9.1	10.6	12.4	12.6
Australia	4.3	3.9	4.7	4.8	3.8	6.5[b]	8.6[b]	10.2[b]	11.9[b]	9.0
Argentina	7.5	5.9	6.3	6.4	6.2	3.7	5.3	4.7	5.9	7.3
South Africa	5.5	5.6	5.3	5.3	5.2	1.9[b]	1.8[b]	1.8[b]	1.8[b]	2.0[b]
Total above	49.7	49.2	49.4	50.1	48.1	34.2	40.2	43.2	48.4	47.6
U.S.	39.7	42.6	43.2	43.6	43.6	17.7	28.1	22.9	32.8	31.9
Total	89.4	91.8	92.6	93.7	91.7	51.9	68.3	66.1	81.2	79.5

[a]Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 13-82 (Washington, D.C.), April 26, 1982; FG 16-75 (Washington, D.C.), December 22, 1975; and FG 7-77 (Washington, D.C.), July 1977; and personal communication with officials of U.S. Department of Agriculture, Foreign Agricultural Service.

[b]Planted area.

Table 12. Soybean Area Harvested in Millions of Hectares in Major Producing Countries, 1982-83 and Comparisons with Recent Years.[a]

	1970-71	1975-76	1978-79	1979-80	1980-81	1981-82	Prelim. 1982-83	Percent Change from 1970-71
U.S.	16.7	20.8	23.4	28.6	27.5	26.9	28.6	+ 71
Brazil	1.3	5.8	7.8	8.8	8.5	8.3	8.5	+ 554
Argentina	0.03	0.4	1.3	2.0	1.7	2.0	2.0	+6,900
China	8.0	8.8	6.8	7.3	7.3	8.0	8.3	+ 4
Canada	0.1	0.2	0.2	0.3	0.3	0.4	0.4	+ 300
Paraguay	0.04	0.2	0.3	0.4	0.4	0.4	0.4	+ 900
Total	26.17	36.2	39.8	47.4	45.7	46.0	48.2	+ 84

[a]Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Crop Production*, WCP 6-82 (Washington, D.C.), May 10, 1982; and *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-83 (Washington, D.C.), April 1983.

Grain and Soybean Yields, Selected Exporting Nations

Table 13. Comparative Yields in Metric Tons Per Hectare of Selected Grain and Soybean Exporting Countries.*

	Coarse Grains				Wheat				Soybeans			
	1975-76	1979-80	1981-82	1982-83	1975-76	1979-80	1981-82	1982-83	1975-76	1979-80	1981-82	Prelim. 1982-83
U.S.	4.35	5.71	5.71	5.86	2.06	2.30	2.32	2.40	1.94	2.16	2.03	2.16
Canada	2.31	2.63	2.83	2.99	1.80	1.64	2.00	2.19	2.32	2.37	2.18	2.35
Argentina	2.44	2.20	2.89	2.66	1.63	1.69	1.38	1.98	1.60	1.80	2.02	1.64
Brazil	1.34	1.73	1.71	1.75	0.92	0.75	1.15	.65	1.72	1.73	1.57	1.80
Australia	1.43	1.47	1.38	.93	1.40	1.45	1.37	.97	1.73	1.83	1.67	1.22
World	1.84	2.17	2.19	2.29	1.56	1.86	1.88	2.03	1.65	1.82	1.73	1.82

*Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Crop Production*, WCP 4-82 (Washington, D.C.), April 12, 1982; *Foreign Agriculture Circular, Grains*, FG 7-77 (Washington, D.C.), July 1977; and *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-78 (Washington, D.C.), April 1978; FOP 5-83 (Washington, D.C.), May 1983; and personal communication with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

World average yields of coarse grains, wheat, and soybeans have trended upward since the mid-1970s, as table 13 indicates. Variations in yields from country to country reflect differences in application of available production technology and management practices as well as differences in climate and soil types. U.S. coarse grain yields are more than double the world average along with wheat and soybean yields moderately higher than the world average. In some years, Canada and Argentina have experienced soybean yields above the U.S. average. Brazilian yields of both coarse grain and wheat consistently have been below the world average. The variation in yields among countries suggests a potential for increased world average yields in the years ahead as currently available technology becomes more extensively used in major grain-producing nations.

Table 14. Cassava Production in Major Producing Nations from 1979 through 1982 in Millions of Metric Tons.*

Area or Country	1972	1979	1980	1981	1982	Forecast 1983
China	2.2	2.7	3.2	3.3	3.3	3.0
India	6.0	6.1	5.8	5.8	5.9	5.9
Indonesia	10.4	13.8	13.7	13.7	12.8	12.8
Philippines	N.A.	2.2	2.3	2.3	2.3	2.4
Thailand	4.0	11.1	13.8	17.7	21.0	16.5
Far East Total	N.A.	40.5	43.2	47.3	48.8	45.2
Ghana	1.7	1.8	1.8	1.9	1.9	2.0
Mozambique	2.5	2.7	2.8	2.9	2.9	2.9
Nigeria	9.6	10.5	11.0	11.0	11.0	11.0
Tanzania	3.5	4.6	4.6	4.7	4.7	4.4
Zaire	10.6	12.0	12.2	13.0	13.2	13.4
Africa Total	39.4	45.0	46.0	47.4	48.5	48.6
Brazil	26.8	25.0	23.5	24.8	24.5	24.5
Columbia	2.0	1.9	2.2	2.2	2.2	2.2
Latin America Total	32.6	30.1	29.1	31.4	31.1	31.0
World Total	99.9	116.7	119.4	126.3	128.4	125.0

*Sources: Food and Agriculture Organization of the United Nations, *Food Outlook*, No. 2, 1983 (Rome, Italy), February 22, 1983; and *Food Outlook, 1982 Statistical Supplement* (Rome, Italy), March 1983.

Cassava Root Production

While grain is the major energy source for human consumption and livestock feeding, cassava is an important food and feed crop in many tropical countries. Cassava is a root crop sometimes known as tapioca. Major producers of this crop are Thailand, Indonesia, Nigeria, Zaire, and Brazil. A sizable part of Thailand's production is exported to the European Community (EC) for use in livestock and poultry feeds, and to a lesser extent to the Soviet Union for the same purpose. The European Community has recently negotiated trade agreements with major cassava exporters in an effort to limit its imports. Cassava imports compete with domestic European grain producers, thus contributing to European Community agricultural surpluses and raising the cost of European Community farm price support programs. Other important importers of cassava include the Republic of Korea and Japan.

Table 14 shows estimated cassava production in major producing nations from 1979 through 1982 and tentative forecasts for 1983. World production increased by an estimated 2 percent in 1982 at the same time that record world grain crops were being harvested. Record cassava production has caused slightly increased competition in world grain markets. Early 1983 prospects pointed to a small decrease in the world cassava crop, with production forecast to be 3 percent smaller than in 1982. World production in 1980 was estimated at the equivalent of the food energy from 40 million metric tons of grain or 2.8 percent of 1980-81 world grain production.

Production has expanded modestly in China, Philippines, Thailand, and Zaire in recent years. In most other areas, however, 1983 production is expected to be at or below the 1979-80 level. In areas such as Africa, extensive production of cassava partially offsets the relatively low level of per capita grain production. In Brazil, part of the cassava crop in future years is expected to be used as a feedstock for alcohol fuel production.

World Production of Pulses

Although world production of pulses is much smaller than that of grains, pulses play an important role in providing protein in developing nations where meat and dairy product consumption is low. Major pulses include such crops as green peas, chickpeas, lentils, cowpeas, mung beans, navy beans, and other types of beans. Table 15 shows world production of pulses from 1971 through 1982. The most significant information from the table is that world pulse production has increased only slightly in the past 12 years, while world population has risen about 24 percent during the same period. World production of pulses on a tonnage basis was equivalent to 3.4 percent of world grain production in 1971. By 1982, it had dropped to 2.9 percent on a tonnage basis equivalent.

The failure of pulse production to increase proportionately with population and grain production is not a matter of serious concern in developed economics. In these areas, protein needs in human diets are being supplied largely through livestock, poultry, and dairy products. However, in parts of Asia, Africa, and Oceania where livestock products are not major factors in diets, stagnating production of pulses implies diets may be more deficient in protein now than they were a decade ago.

Table 15. World Pulses Production in Major Producing Areas, 1971-82, in Millions of Metric Tons.[a]

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	Prelim. 1982
Asia	21.4	20.6	20.7	19.6	20.4	23.0	21.8	22.3	22.2	19.5	21.1	22.0
Africa	4.5	5.0	4.7	5.0	5.3	5.6	4.9	5.1	5.1	5.0	5.2	5.5
Central America	1.6	1.5	1.7	1.7	1.7	1.3	1.5	1.7	1.5	1.7	2.3	1.9
South America	3.4	3.4	2.9	3.0	3.0	2.6	3.1	3.0	3.1	2.8	3.2	3.9
North America	1.1	1.1	1.0	1.3	1.1	1.1	0.9	1.3	1.3	1.6	1.9	1.6
Western Europe	2.2	2.0	2.0	2.1	1.9	1.6	1.7	1.8	1.7	1.7	[b]	[b]
Eastern Europe	1.0	0.8	0.8	0.9	0.8	0.7	0.7	0.9	0.7	0.8	[b]	[b]
USSR	6.9	7.1	8.4	8.7	5.3	8.7	7.5	7.8	4.3	6.4	5.6	6.5
Oceania	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	[b]	[b]
World Total	42.2	41.6	42.3	42.4	39.7	44.8	42.2	44.0	40.1	39.7	42.3	44.7

[a]Sources: Food and Agricultural Organization of the United Nations, *Food Outlook 1982 Statistical Supplement* (Rome, Italy), March 1983; and *Food Outlook* No. 3, 1983 (Rome, Italy), March 29, 1983.

[b]Data are not available for these area divisions but are included in the world total.

World Livestock and Poultry Production Trends

World meat production forms the base from which global demand for coarse grains and oilseed meals is generated. These products serve primarily as ingredients for livestock and poultry production, so trends in meat production are important indicators of changing demand for grains and oilseeds. World red meat production declined slightly in 1982 and a further decline is anticipated in 1983 as the global economy adjusts to high unemployment levels, serious debt burdens, slow economic growth, and slightly higher feed costs than in the previous two years. Reduced red meat production is being partially offset by increased world poultry meat production, with total consumer meat supplies being reduced only slightly. However, the changing composition of meat is tending to reduce grain consumption somewhat more than meat output because poultry production requires less grain per unit of meat produced than beef and pork.

Pork and Poultry Production

World pork production expanded sharply in the last half of the 1970s (see table 16) but declined by approximately 2 percent in 1982 (excluding China). The largest percentage declines were in the United States (down 10 percent from 1981), Eastern Europe (down 3 percent), Soviet Union, and Canada (both down 2 percent). European Community pork production remained approximately constant in 1982 while production rose by 4 percent in other West European nations, 2 percent in Japan, 10 percent in Mexico, and 20 percent in the Republic of Korea. In 1983,

Table 16. Pork Production in Major World Producing Areas, 1974-78 Average and 1979 Through 1983 in Millions of Metric Tons.[a]

Area	1974-78 Average	1979	1980	1981	Prelim. 1982	Proj. 1983
U.S.	5.9	7.0	7.5	7.2	6.5	6.6
Other N. America	1.5	2.0	1.8	2.0	2.1	2.0
South America	1.0	1.1	1.2	1.2	1.2	1.2
EC-10	8.2	9.1	9.3	9.5	9.4	9.6
Other W. Europe	1.9	2.2	2.3	2.4	2.5	2.5
E. Europe	6.3	6.8	6.8	6.6	6.5	6.3
USSR	5.2	5.3	5.2	5.2	5.1	5.2
Asia (Exc. PRC)	2.0	2.7	2.8	2.7	2.8	2.9
Oceania	.2	.2	.3	.3	.3	.3
Total[b]	32.2	36.5	37.2	37.1	36.3	36.6

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL & P 2-83 (Washington, D.C.), May 1983.

[b]Totals may not add due to rounding.

Table 17. Total Poultry Production in Major World Producing Areas, 1974-78 Average and 1979 Through 1983 in Millions of Metric Tons.[a]

Area	1974-78 Average	1979	1980	1981	Prelim. 1982	Proj. 1983
U.S.	5.3	6.5	6.6	7.0	7.0	7.3
Other N. America	.8	.9	1.0	1.1	1.1	1.1
South America	1.0	1.5	1.8	2.0	2.1	2.2
EC-10	3.4	3.8	4.0	4.1	4.3	4.3
Other W. Europe	.9	1.0	1.1	1.2	1.2	1.2
E. Europe	1.6	1.9	1.9	2.0	1.8	1.8
Soviet Union	1.5	2.0	2.1	2.3	2.5	2.7
Africa	.2	.4	.5	.5	.5	.6
Japan	.9	1.1	1.2	1.1	1.2	1.2
Other Asia and Oceania	.4	.5	.5	.5	.5	.5
Total[b]	16.1	19.7	20.7	21.8	22.3	22.8

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL & P 2-83 (Washington, D.C.), May 1983.

[b]Totals may not add due to rounding.

production is projected to rise moderately in the United States along with modest increases in the European Community and the Far East. East European production is expected to continue a slight downward trend as it adjusts to serious debt burdens and other economic difficulties. With these trends, global pork production is projected to rise by slightly less than 1 percent this year.

In times of rising grain prices or economic recessions, poultry meat is a strong competitor of pork and beef. This has been the case since the mid-1970s as the world livestock and poultry industries adjusted to uncertain grain supplies and prices. World poultry meat production in 1982 (excluding China) is estimated to have been 13 percent above three years earlier and 39 percent above the 1974-78 average. An additional 2 percent increase in world poultry production is anticipated in 1983. Areas of rapid growth in poultry output in 1982 included the Soviet Union (up 9 percent from 1981) and the European Community, Japan, Brazil, and Mexico with increases of 5 to 7 percent from the previous year. Eastern Europe was the one major exception to this trend, with poultry production estimated to be down 11 percent from the previous year's record. In Eastern Europe, the sharpest decline occurred in Poland where poultry meat output fell 58 percent from the 1981 record. Poultry output in most other East European nations in 1982 was steady to slightly above the previous year. A slight recovery is tentatively projected in Polish poultry production in 1983 and 1984.

Beef Production

Global beef production is a less reliable indicator of coarse grain and protein meal demand than pork and poultry. The reason for this is that a sizable part of the world's beef supply is produced with pasture and roughage feeding, and urea can be used as a protein source in the cattle industry in place of soybean meal. Beef production is influenced by a wide range of factors including a long-term cycle, weather, pasture conditions, and the culling rate for breeding stock, as well as feed costs and economic conditions. As table 18 indicates, global beef production has fluctuated in a narrow range since the mid-1970s with no definite trend. Production in 1982 (excluding China) is estimated to have declined by 0.2 percent from the previous year. The main areas with lower beef production were Argentina (down 15 percent) and the European Community (down 5 percent). Beef production in 1982 increased modestly in Brazil, Poland, Australia, and the Soviet Union. In 1983, it appears that global beef production will decline by slightly less than 1 percent. A sizable part of the decline is expected to be in Australia, where increased 1982 production reflected slaughter of breeding herds as severe drought reduced pasture, water, and forage supplies.

Table 18. Beef and Veal Production in Major World Producing Areas, 1974-78 Average and 1979 Through 1983 in Millions of Metric Tons.[a]

Area	1974-78 Average	1979	1980	1981	Prelim. 1982	Proj. 1983
			(Carcass Weight)			
U.S.	11.5	9.9	10.0	10.4	10.4	10.5
Other N. America	2.2	2.3	2.4	2.5	2.7	2.5
South America	6.1	6.4	6.3	6.7	6.3	6.3
EC-10	6.6	6.9	7.1	6.9	6.6	6.8
Other W. Europe	1.1	1.1	1.1	1.2	1.2	1.2
E. Europe	2.5	2.6	2.6	2.3	2.4	2.3
USSR	6.7	6.9	6.7	6.6	6.7	6.7
S. Africa	0.5	0.6	0.6	0.5	0.6	0.6
Asia (Excl. PRC)	0.8	0.9	0.9	1.0	1.0	1.0
Oceania	2.4	2.3	2.0	1.9	2.2	1.8
Total[b]	40.3	40.0	39.8	40.0	40.0	39.7

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL & P 2-83 (Washington, D.C.), May 1983.

[b]Totals may not add due to rounding.

Financial Developments Restraining U.S. and World Trade

In the last two years, it has become clear that monetary policies are a major influence on U.S. agricultural exports. In fact, key factors behind the recent weakness in farm product exports included (1) recent strength of the U.S. dollar and (2) debt burdens of several important grain importing and exporting nations. These developments are related to U.S. and foreign monetary policies.

Recent Strength of the U.S. Dollar

In the early 1970s, U.S. trade deficits and less restrictive U.S. and foreign monetary policies brought a shift from fixed currency exchange rates to variable rates that fluctuate with changing market conditions. This change led to a substantial depreciation of the U.S. dollar against most foreign currencies during the decade. As the dollar fell in value, foreign buyers of farm products could obtain more U.S. dollars per unit of their domestic currency than previously. That dramatically lowered the cost of U.S. agricultural products in many foreign markets, and contributed to the upward explosion of American farm exports from 1972 to 1980. By the end of the decade, the U.S. Federal Reserve System began restraining money supply growth in an effort to curb inflationary pressures. This restraint along with the resulting high U.S. interest rates, tax policies aimed at encouraging U.S. domestic investment, and other factors brought a flow of funds into the U.S. for investment purposes.[3] The in-flow of funds has substantially strengthened the U.S. dollar against most foreign currencies in the last two and a half years. A stronger dollar increases foreign buyers' costs of purchasing U.S. farm products, thus retarding export demand.

Table 19 shows Chicago cash corn and soybean prices in U.S. dollars and equivalent units of selected foreign currencies. To illustrate the effect of the recent stronger dollar relative to other currencies, the Chicago soybean price dropped 27 percent from the last quarter of 1980 to the first quarter of 1983. Yet, the equivalent price in Italian lira actually increased by 17 percent. Percentage changes for prices in other important foreign currencies were as follows: British pound, up 7 percent; Spanish peseta, up

Table 19. Chicago Cash Corn and Soybean Prices in U.S. Dollars and Foreign Currency Equivalents 1977 and 1980-83.[a]

			Foreign Prices[d]						Foreign Prices[d]					
Year	Quarter[b]	Chicago Cash Corn[c]	Brazil (Cruzeiro)	Japan (Yen)	Mexico (Peso)	Rep. Korea (Won)	Taiwan (Dollar)	Chicago Cash Soybean	Italy (Lira)	Japan (Yen)	Netherlands (Guilder)	Spain (Peseta)	U.K. (Pound)	W. Germany (Mark)
1983	II	3.22	1341.1	768.9	492.7	2457.5	129.1	6.4	9222.4	1528.8	17.5	873.6	4.3	13.7
	I	2.46	610.6	565.8	[e]	1833.2	99.8	5.7	7756.6	1304.1	14.8	712.4	3.5	13.4
1982	IV	2.06	415.7	553.5	[e]	1529.9	81.5	5.2	7369.8	1394.6	14.3	591.4	3.1	13.1
	III	2.67	452.6	680.3	128.4	1977.1	104.0	6.2	8571.7	1574.7	16.8	689.4	3.6	15.2
	II	2.63	388.9	646.2	119.9	1862.0	97.3	6.4	8402.0	1565.1	17.0	681.5	3.6	15.3
	I	2.54	311.4	556.0	66.7	1753.6	96.3	6.1	7307.3	1339.7	15.1	590.5	3.2	13.7
1981	IV	2.53	258.5	589.9	63.8	1733.1	96.1	6.2	7346.3	1447.9	16.1	597.5	3.3	14.4
	III	3.32	302.0	756.5	81.2	2267.9	121.1	6.9	8271.3	1574.4	18.5	666.0	3.7	16.7
	II	3.50	266.5	744.1	83.2	2340.5	125.4	7.6	7957.2	1615.8	17.7	646.0	3.4	16.0
	I	3.66	233.8	740.8	84.7	2419.3	131.2	8.0	7461.3	1615.2	17.1	632.8	3.4	15.8
1980	IV	3.37	187.0	701.1	77.6	2006.0	121.3	7.7	6647.8	1608.2	15.2	566.2	3.2	14.0
	III	2.81	144.6	616.8	64.2	1653.0	101.2	6.6	5525.4	1442.1	12.7	459.9	2.8	11.6
	II	2.55	118.8	651.3	58.1	1168.8	91.4	5.6	5132.4	1440.5	12.0	414.0	2.6	11.1
	I	2.63	111.3	625.4	59.9	1249.3	93.9	6.2	4938.5	1467.2	11.7	407.8	2.8	10.5
1977	IV	1.84	27.5	479.3	41.7	876.2	69.4	5.1	4502.2	1331.1	12.5	431.2	2.9	11.7
	III	2.14	30.6	571.3	49.4	1019.0	80.8	7.0	6145.0	1855.3	17.2	484.3	4.0	16.3
	II	2.52	32.5	693.3	56.8	1200.0	95.1	9.1	8056.8	2497.9	22.6	621.9	5.3	21.7
	I	2.51	30.8	733.9	48.9	1195.2	94.7	6.9	6061.1	2029.3	16.9	473.4	4.1	16.3

[a]Sources: *Statistical Annual Chicago Board of Trade* (Chicago: Chicago Board of Trade), various issues; and United States Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Missouri), various issues.

[b]All prices were quoted as of the first trading day of the quarter.

[c]Hopper car corn bids.

[d]Does not include transportation or transaction costs.

[e]Mexican pesos were not traded at these times due to the peso crisis.

26 percent; West German mark, down 4 percent; and Japanese yen, down 19 percent. Delivered prices at overseas destinations may have changed by slightly different percentages, depending on developments in freight, handling, and other marketing costs. The key point is that with the stronger dollar, prices to foreign buyers have declined much less in the past two and a half years than in the U.S. cash markets. In some foreign markets, prices to foreign users have increased substantially despite the drop in U.S. prices in late 1982 and early 1983. Similar conclusions can be drawn for soybean products.

With coarse grains and wheat, several countries have policies that partially remove the effects of exchange rate variations on foreign consumers. For example, the European Community has a complex variable levy or import tax designed to stabilize domestic grain prices. When world prices are low, the variable tax or levy automatically increases to bring the cost of imported grains up to European Community support levels.[4] The system also includes Monetary Compensatory Amounts (MCAs) to adjust for varying exchange rates.[5] In Japan, India, China, Russia, and a number of other countries, food grains are purchased by government agencies and resold to consumers at established prices. In these instances, the full extent of exchange rate variations will not immediately be reflected back to foreign users of U.S. grain. Consequently, short-term exchange rate fluctuations can be expected to have somewhat less impact on coarse grain and wheat exports than in soybeans, where few import restrictions exist. However, many countries outside the European Community, including Japan, Taiwan, and other Asian Rim nations, allow relatively free private imports of corn and, thus, are influenced by exchange rates. For that reason, U.S. corn exports also are affected by the value of the dollar in world currency markets. In the Soviet Union, gold sales are a means of earning foreign exchange for purchases of U.S. grain. Thus, Soviet ability to purchase grain depends more on the dollar price of gold than on exchange rates.

Foreign Debt Burdens

In many areas, strong economic growth during the 1970s was financed by deficit government spending with a rapid expansion of outstanding private and public debts. Inflationary expectations also contributed to the accumulation of debt. Both governments and private borrowers anticipated inflated prices of their exports would meet future cash-flow requirements for debt servicing. With global inflation slowing dramatically in the early 1980s, large outstanding debts are now limiting the ability of many nations to obtain financing for purchases of U.S. farm products. Exporting nations also are being pressured to maintain and/or increase exports to meet foreign exchange needs for debt servicing. With sluggish global demand, these pressures are creating a trade environment where exporters attempt to use price reductions, subsidies, and other means for expanding their shares of a declining total market.

Table 20. September 1982, Estimated Outstanding Debt of Selected Nations in Billions of U.S. Dollars.[a]

	Total	From Private Banks
Brazil	$87.0	$67.5
Mexico[b]	81.0	68.0
Argentina	36.6	27.5
Venezuela[b]	35.5	29.0
S. Korea	35.0	21.4
Poland	26.0	24 0
Indonesia[b]	21.9	9.6
Philippines	18.0	11.6
Nigeria[b]	10.0	8.0

[a]Source: *Wall Street Journal*, (Chicago, Illinois), September 15, 1982.

[b]Oil exporting countries.

Table 20 shows late 1982 estimates of outstanding debt for nine selected countries. Four of these nations are significant petroleum exporters. Most are grain and oilseed importers. The two major farm product exporters are Brazil and Argentina, although Brazil is a major importer of wheat. At least two nations, Poland and Mexico, have been unable to meet scheduled debt repayments in 1982 and 1983. Others indicate they soon may be unable to meet repayments as scheduled.[6] When countries fall behind on debt repayments, private financial institutions are reluctant to extend credit for additional imports of farm products or other items. In the next few years, these debts appear likely to continue restraining the growth of foreign demand for U.S. agricultural products. To deal with these problems, debtor nations appear likely to limit imports, extend debt repayment periods, and adopt more restrictive fiscal policies to slow the build-up of additional debt. More restrictive fiscal policies also would tend to slow the growth of foreign demand for farm products in the two- to four-year adjustment period ahead.

Impact of Export Growth on U.S. Agriculture During the 1970s and Early 1980s

U.S. exports of farm products increased in value by an astounding 501 percent between 1970 and 1981. This upward explosion of foreign demand had far-reaching effects on the U.S. agricultural sector. Impacts included expanded capacity of the fertilizer, chemical, and machinery industries; temporarily increased net farm incomes; sharply higher land values; more total acres being planted and harvested; expanded use of irrigation in some areas; a tendency toward increased specialization of farms; and expanded handling capacity of elevators, the transportation industry, and U.S. port facilities. The explosive growth began with an 88 percent increase in U.S. agricultural exports in 1973 with devaluation of the U.S. dollar, the emergence of Russia as a large net importer of feed grains, crop problems in several areas of the world, and strong global economic growth. Export expansion during the rest of the decade was not quite as dramatic although increases of 20 to 25 percent occurred in four other years. Expectations of strong growth were projected in investment decisions as the entire agricultural sector attempted to expand its capacity to meet growing foreign demand. With the nation's agriculture geared toward steadily growing demand, severe financial stresses have developed in the last 18 to 24 months as U.S. producers and agribusinesses attempt to adjust capacity downward to match a lower level of foreign demand and to meet cash flow requirements from previous investments. Current stresses in U.S. agriculture can best be understood when viewed from the expansionary adjustments that occurred during the 1970s.

Effect on Cash Receipts

Cash receipts from marketings of all U.S. farm commodities increased by 184 percent from 1970 to 1981—from $50.5 billion at the start of the decade to $143.5 billion in 1981. With much of the export growth concentrated in feed grains and soybeans, cash receipts from these crops rose by 264 percent and 293 percent, respectively. In the same period, the general level of all U.S. prices, as measured by the consumer price index, rose by 149 percent. Thus, a sizable part of the increased cash receipts represented inflationary gains. An additional portion of the larger receipts was passed on to agricultural input industries as U.S. farmers updated their machinery, adopted larger capacity equipment, increased the use of fertilizer and other agricultural chemicals, and invested in improved grain handling and storage facilities. Cash receipts from meat animal marketings increased by 112 percent from 1970 to 1981, with the increase being caused largely by inflation in the level of U.S. prices (see table 21). Sharper increases in dairy product cash receipts reflected the government price support program and rising price support levels. Cash receipts from poultry increased by 193 percent from 1970 to 1981 because of changing consumer preferences and greater feed conversion efficiency in the broiler industry than in other livestock feeding enterprises.

Table 22 shows a dramatic rise in exports as a percentage of cash receipts from farm marketings during the 1970s. At the start of the decade, less than 9 percent of U.S. cash receipts from farm marketings originated from exports. By the end of the decade, this figure had risen to about 21 percent and nearly one out of every three harvested acres in the U.S. produced for foreign markets.

Table 21. Cash Receipts From U.S. Marketings of Agricultural Commodities by Commodity Groups, Calendar Years 1970-81 in Millions of Dollars.*

Year	Feed[b] Grains	Soybeans	Meat[c] Animals	Dairy[d] Products	Poultry[e]	All Commodities	Total of Five Groups	Share of Five to All Commodities (percent)
1981	16,359	12,421	39,146	18,106	6,277	143,467	92,300	64.3
1980	14,917	13,373	40,564	16,598	5,681	136,431	91,133	66.8
1979	12,346	12,984	43,900	14,659	5,405	131,916	89,294	67.7
1978	10,038	11,822	37,454	12,690	5,008	112,924	77,012	68.2
1977	10,458	8,700	27,842	11,752	4,149	95,685	62,901	65.7
1976	11,570	8,617	26,954	11,428	4,031	94,501	62,600	66.2
1975	10,757	6,432	25,793	9,923	3,996	88,209	56,901	65.5
1974	12,672	9,185	25,164	9,445	3,376	92,649	59,842	64.7
1973	9,580	6,918	30,404	8,080	3,960	87,068	58,942	67.7
1972	5,079	3,887	23,974	7,135	2,382	61,190	42,457	69.4
1971	4,834	3,319	19,516	6,810	2,168	52,860	36,647	69.3
1970	4,487	3,161	18,475	6,525	2,140	50,454	34,788	68.9

*Sources: United States Department of Agriculture, Economic Research Service, *Agricultural Outlook* (Washington, D.C.), June 1982; *Economic Indicators of the Farm Sector: State Income and Balance Sheet Statistics* (Washington, D.C.), various issues; and *Farm Income Statistics* (Washington, D.C.), various issues.

[b]Feed Grains—Corn, Sorghum, Barley, Oats

[c]Meat Animals—Cattle and Calves, Hogs, Sheep and Lambs

[d]Dairy Products—Milk Wholesale, Milk Retail, Milk Fat

[e]Poultry—Broilers, Turkeys, Chickens on Farm

Impact on Area Planted to Major Crops

With rapidly expanding foreign demand, U.S. area devoted to corn, wheat, and soybeans increased sharply in the 1970-82 period. Corn area expanded by 26 percent from 1970 to 1981 along with a 71 percent expansion of U.S. soybean plantings from 1970 to 1982. U.S. wheat acreage during this same period expanded by 83 percent. Increased area devoted to these crops came from land previously idled under U.S. farm programs, reduced plantings of oats and barley, land clearing, pastures, and areas previously devoted to forage production.

Impact on Fertilizer Utilization

Usage of all commercial fertilizers in the U.S. increased by 34.6 percent from 1969 70 to 1980-81 on a plant nutrient basis, with much of the increase caused by sharply expanded export demand for U.S. grains and oilseeds. Because total planted area of major crops increased by 22 percent during this same period," fertilizer application rates per acre rose as farmers attempted to boost yields per acre. Table 24 indicates the most rapid growth in fertilizer usage was in nitrogen, with total usage rising by 59 percent in the 11-year period. Potassium utilization rose by 58 percent, with usage of phosphate fertilizers up by 17 percent during the same period.

Increased fertilizer utilization was an important factor behind rising U.S. average crop yields. The U.S. average corn yield, for example, rose 59 percent from 72.4 bushels per acre in 1970 to a record 114.8 bushels per acre in 1982. The nation's average wheat yield rose by 15 percent in the same period, along with increases of 17 percent in grain sorghum and 21 percent in soybeans. For other major U.S. crops, yield increases during this same period included 19 percent for oats, 34 percent for barley, and 33 percent for cotton. In addition to increased fertilizer utilization, other factors contributing to higher yields included improved varieties, expanded use of chemical weed and insect control, increased use of irrigation in areas where water supplies are available, and larger capacity equipment to permit more timely field operations. The sharp rise in grain prices in the early 1970s generated increased investment in all these areas as U.S. grain producers responded to market signals to produce more grain, oilseeds, and other crops for world markets.

The resulting sharp expansions in fertilizer utilization necessitated major investments in fertilizer production, transportation, storage, distribution, and application facilities. Expanded demand for nitrogen fertilizer was met both by expanded domestic production and imports from areas of the world where low-cost natural gas is available for nitrogen fertilizer producton. Expanded use of po-

Table 22. Cash Receipts From U.S. Farm Marketings and Value of Agricultural Exports, Calendar Years, 1970-81.

Year	Cash Receipts[a]	Exports[b]	Export Share of Cash Receipts
	(million dollars)		(percent)
1981	92,300	19,151	20.7
1980	91,133	18,948	20.8
1979	89,294	16,769	18.8
1978	77,012	13,686	17.8
1977	62,901	11,606	18.5
1976	62,600	11,372	18.2
1975	56,901	9,541	16.8
1974	59,842	9,686	16.2
1973	58,942	7,612	12.9
1972	42,457	3,994	9.4
1971	36,647	3,154	8.6
1970	34,788	3,046	8.8

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Crop Production*, WCP 6-82 (Washington, D.C.), May 10, 1982; and *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-83 (Washington, D.C.), April 1983.

[a]Includes cash receipts from marketing feed grains, soybeans, meat animals, dairy products, and poultry.

[b]Includes export values of feed grains, soybeans, meat and meat products, hides and skins, animal fats, oils and greases, poultry meats, and dairy products.

Table 23. Acreage Planted to Selected U.S. Crops, Calendar Years, 1970-82.[a]

Year	All Corn	All Sorghum	Oats	Barley	Soybeans	All Wheat	Total, Six Crops	Total, 20[b] Principle Crops	Six, Crops as Percent of Total
1982	81.9	16.1	14.2	9.6	72.2	87.3	281.3	362.7	77.6
1981	84.2	16.0	13.7	9.7	68.0	88.9	280.5	364.8	76.9
1980	84.0	15.6	13.4	8.3	70.0	80.6	271.9	356.2	76.3
1979	81.4	15.3	14.0	8.1	71.6	71.4	261.8	346.8	75.5
1978	81.7	16.2	16.4	10.0	64.7	66.0	255.0	336.8	75.7
1977	83.6	17.0	17.7	10.6	58.8	75.1	262.8	344.0	76.4
1976	84.4	18.4	16.7	9.2	50.3	80.2	259.2	336.3	77.1
1975	78.6	18.1	16.5	9.3	54.6	74.8	251.9	332.4	75.8
1974	77.8	17.7	18.0	9.0	53.5	71.4	247.4	318.9	77.6
1973	71.9	19.2	19.1	11.2	56.7	59.0	237.1	310.8	76.3
1972	67.0	17.3	20.1	10.6	46.9	54.9	216.8	283.5	76.5
1971	74.0	20.8	22.0	11.1	43.5	53.8	225.2	295.3	76.3
1970	66.9	17.0	24.5	10.3	42.2	48.7	209.6	283.2	74.0

[a]Source: U.S. Department of Agriculture, Statistical Reporting Service, *Crop Production, 1982 Annual Summary*, CrPr 2-1(83) (Washington, D.C.), January 13, 1983, and various other issues.

[b]Sunflower seeds are included after 1975 but not in earlier years.

tassium was made possible by increased production in the United States and Canada, while increased phosphate supplies came primarily from U.S. origins. At this writing, the U.S. fertilizer industry is facing severe adjustments as a result of acreage idled under the Payment-in-Kind Program and rising costs of natural gas for nitrogen production. The Payment-in-Kind Program is an effort of policy makers to match production with the current lower level of export demand for corn, wheat, and other crops.

Expanded Elevator Storage Capacity

Expanded exports and increased U.S. grain and oilseed production required sharply increased commercial and on-farm grain storage capacity in the 1970s and early 1980s. Capacity data for on-farm U.S. grain storage facilities are not available. However, off-farm U.S. storage capacity expanded from 5.64 billion bushels on January 1, 1970, to a record 7.86 billion bushels by January 1, 1983. That is an increase of 39 percent during the 13-year period. Capacity expanded most rapidly toward the end of the period as stocks of grain under the U.S. grain reserve program increased sharply. The number of off-farm grain storage facilities declined by 3.5 percent to 14,544 establishments from January 1, 1977, to January 1, 1983. Average capacity of U.S. off-farm grain storage facilities rose to 541,000 bushels during the 13-year period as elevators were modernized and increased in size to boost efficiency and provide more adequate services to farm customers during the critical harvest period (see table 25).

Storage capacity for the U.S. Farmer-Owned Grain Reserve expanded more rapidly on farms in the late 1970s and early 1980s than at county elevators. The government storage payment of 26.5 cents per bushel for reserve corn in most cases fell short of annual elevator grain storage charges. That, along with income tax incentives for established farmers, favored constructing new reserve storage on individual farms in many instances.

U.S. port storage and handling capacity also has been expanded substantially in recent years to accommodate export growth. As table 26 illustrates, storage capacity of all U.S. ports expanded by 21 percent in the three-year period from 1977 through 1980. Port elevators now account for about 5 percent of the total U.S. commercial grain storage capacity, up slightly from the mid-1970s. Along with increased storage capacity, handling capacity at U.S. port elevators was greatly expanded and modernized to provide rapid receiving, weighing, grading, and load-out services to accommodate growing world demand.

Transportation Adjustments

As the U.S. grain industry became more export-oriented, major adjustments also were required in the nation's transportation system. The land-locked portion of the U.S. grain belt shifted away from older, smaller 40-foot side-door rail boxcars to the larger 100-ton covered hopper cars. These latter cars can be loaded rapidly from the top, in contrast to the need for cardboard doors inside the main sliding door of the older box cars. Hopper cars also can be unloaded quickly by gravity with the use of hopper doors on the under-side of the car. Thus, handling time and costs have been significantly reduced by investments in these newer types of equipment. Larger rail cars, however, also necessitated substantial in-

Table 24. U.S. Commercial Fertilizer and Primary Plant Nutrient Use in Millions of Short Tons Plant Nutrient Equivalent, Fertilizer Marketing Years (July-June) 1969-70 to 1981-82.

Year Ended June 30	Total Use[a]	Nitrogen[b]	Phosphate[b]	Potassium[b]	Total of[b] Three
1982	48.7	11.1	4.8	5.6	21.5
1981	54.0	11.9	5.4	6.3	23.7
1980	52.8	11.4	5.4	6.2	23.1
1979	51.5	10.7	5.6	6.2	22.6
1978	47.5	10.0	5.1	5.5	20.6
1977	51.6	10.6	5.6	5.8	22.1
1976	49.2	10.4	5.2	5.2	20.8
1975	42.5	8.6	4.5	4.5	17.6
1974	47.1	9.2	5.1	5.1	19.3
1973	43.3	8.3	5.1	4.6	18.0
1972	41.2	8.0	4.9	4.3	17.2
1971	41.1	8.1	4.8	4.2	17.2
1970	39.6	7.5	4.6	4.0	16.1

Source: U.S. Department of Agriculture, Statistical Reporting Service, *Commercial Fertilizers*, SpCr 7(11-82) (Washington, D.C.), November 1982.

[a]Gross tons of fertilizer material. [b]Plant Nutrient Equivalent basis.

Table 25. Number and Rated Capacity of U.S. Off-Farm Grain Storage Facilities in Millions of Bushels, January 1, 1970 to 1983.

Year	Number	Total Capacity	Average Capacity Per Facility Thousands of Bushels
1983	14,544	7,864	541
1982	14,691	7,269	495
1981	14,944	7,173	480
1980	15,178	7,090	467
1979	15,363	6,985	455
1978	15,305	6,635	434
1977	15,073	6,310	419
1976	*	6,092	*
1975	*	5,918	*
1974	*	5,885	*
1973	*	5,810	*
1972	*	5,695	*
1971	*	5,697	*
1970	*	5,637	*

Source: U.S. Department of Agriculture, Statistical Reporting Service, *Grain Stocks*, GR 11-1 (Washington, D.C.), January 21, 1983; and January issues for 1971-1982.

*No estimates on number of facilities were available prior to 1977.

vestments for up-graded tracks to handle the heavier loads. The rail industry in the 1970s shifted dramatically away from single-car grain shipments to unit train and other multi-car shipments, with these trains moving directly from county elevators to port facilities with a minimum of intermediate stops. In the process, rail service has been streamlined, modernized, and concentrated on a smaller number of more heavily used lines to spread fixed costs over greater volumes of grain and farm supplies. As these adjustments occurred, the nation's fleet of 40-foot, narrow-door boxcars declined by approximately two-thirds from 1970 to 1980. The U.S. fleet of covered hopper cars, on the other hand, increased by 43 percent from 1970 to 1982, rising from 161,000 to 231,000 cars at the end of the period. With these changes, the total one-time carrying capacity of the U.S. rail fleet increased by about 13 percent in the 13-year period. The annual rail transportation capacity, however, increased much more because of greater efficiencies in utilizing available equipment and reduced turn-around times from midwest grain areas to major ports.

The annual bushel movement of grain and soybean crops by U.S. railroads in 1979 was slightly below the peak years of the early 1970s. During the decade, grain movement ranged from a high of 4.5 billion bushels in 1973 to a low of 3.9 billion bushels in 1977.[4] For the seven-year period ending in 1977, the average annual movement of grain and soybeans by rail was 4.2 billion bushels. The 1979 level of 4.4 billion bushels was 91 million bushels (20 percent) less than the movement in 1973.

The 1970s also were a period of heavy investments in barge transportation facilities. To meet rising world demand for grain and oilseeds and to service the expanding demand for fertilizer and other farm inputs, the industry invested heavily in new and larger barges and other equipment. Annual barge grain movement increased during four of these same seven years. From 1973 to 1981, U.S. barge shipments of grain expanded by 634 million bushels or 64.2 percent. Most of the expansion occurred during the first three years of the period with barge movement remaining relatively stable from 1976 to 1981.

Railroads' share of U.S. grain shipments was relatively steady in the late 1970s, averaging approximately 72 percent of total movement. Prior to 1976, the rail share had been about 80 percent.

As with all other sectors of U.S. agriculture, the nation's transportation industry sharply expanded its capacity in the 1970s and early 1980s in anticipation of continued export growth in the years ahead. Declining exports, which have caused substantial excess grain transportation capacity along with excess grain handling and storage capacity, are placing considerable pressure on industry profit margins during mid-1983. Future financial health of these industries, along with farm supply firms, depends heavily on expanded foreign demand for U.S. farm products.

Table 26. Rated Capacity of U.S. Port Grain Storage Facilities by Region in Millions of Bushels and Percentage Share of Total Off-Farm Storage, Selected Years, January 1, 1977-83.

Year	Atlantic	Gulf	Lakes	Pacific Northwest	Total U.S.	Share of Total U.S. Off-Farm Storage
1983	40.3	117.2	111.3	60.4	329.2	4.2
1982	41.1	128.6	122.6	60.4	352.6	4.9
1980	41.9	132.0	121.2	58.1	356.3	5.0
1978	42.0	108.7	110.1	55.4	316.2	4.5
1977	37.3	91.5	107.2	58.3	294.3	4.7

Sources: Milling and Baking News, *Grain Directory Buyer's Guide* (Kansas City, Missouri: Sosland Publishing Co.), various issues; U.S. Department of Agriculture, Statistical Reporting Service, *Grain Stocks*, Gr 11-1 (Washington, D.C.), January 21, 1983; and various other issues.

Table 27. Number and Capacity of U.S. Rail Grain Cars, Calendar Years, 1970-83.[1]

Year	Number of Box Cars[2]	Number of Covered Hoppers[3]	Total	Total Capacity[3]
	(thousand cars)			(mil. bushels)
1983	15.4	232.7	248.1	822.0
1982	30.9	230.7	261.6	846.2
1981	43.0	218.1	261.1	827.5
1980	58.3	186.0	244.3	748.0
1979	66.2	161.8	227.9	682.5
1978	86.5	148.7	235.2	678.6
1977	107.7	230.1	337.8	997.7
1976	131.6	228.3	359.9	1,039.4
1975	149.5	219.4	368.9	1,044.9
1974	164.7	204.9	369.6	1,026.1
1973	178.5	186.2	364.7	990.2
1972	190.0	179.9	369.9	991.6
1971	207.6	170.7	378.4	995.9
1970	180.9	161.1	341.9	909.4

Source: U.S. Department of Agriculture, Office of Transportation, *Grain Transportation Situation* (Washington, D.C.), April 25, 1983; and various other issues.

[1]Inventory of railroad cars are as of January 15 for 1982-1983 and January 1 for 1970-1981.

[2]40-foot narrow door boxcars.

[3]Data on covered hopper cars, total grain cars, and total bushel capacity during 1978-1983 are not directly comparable to prior years. The total number of hoppers has been subdivided into large and small capacity cars since 1978. Smaller cars are not used for grain movement unless necessary; for this reason, they were excluded from the total number of hoppers in recent years. If smaller cars had been included in the 1980 hopper category, the number of hopper cars would have been 268,919. The total number of grain cars would increase to 391,294 and total bushel capacity would be 1,031.4 million bushels.

U.S. Payment-in-Kind Program and Agricultural Exports

In January 1983, the U.S. Administration offered grain and cotton producers a relatively new farm program, which will have potentially significant effects on world grain and oilseed trading patterns, world prices for major crops, and world carryover stocks. The program, known as Payment-in-Kind (PIK), pays U.S. producers grain or cotton from government-owned and reserve stocks in return for sharply reducing plantings.[10] The program was developed to alleviate serious financial stress in the U.S. crop sector, rising government storage costs, and limited funds for paid land diversion programs. Another important factor behind the shift in U.S. farm policy was the rapid rise in grain carryover stocks during the past three years. U.S. stocks rose sharply during this period, while non-U.S. stocks actually declined. Tentative projections indicate that by the end of the current 1982-83 marketing year, the U.S. will hold nearly three-fourths of the world's feed grain carryover stocks. That's a dramatic increase from the 43 percent share only two years earlier.

The 1983 PIK program is available to wheat, corn, sorghum, cotton, and rice producers. Heavy participation is expected to reduce 1983 U.S. harvested acreage of individual crops by 12 to 28 percent below last year.[11] The program also has reduced 1983 soybean plantings indirectly through reduced plantings of winter wheat, which normally would be double-cropped with soybeans. Production of major crops is expected to decline somewhat more than total plantings because of widespread drought. However, farmers have idled their poorest land first with 1983 plantings being concentrated primarily on high-quality land. In some cases, producers also may have increased fertilizer application rates per acre in an effort to boost yields.

With the introduction of PIK, U.S. farm policy is shifting away from the Farmer-Owned Reserve, which has been the centerpiece of farm programs in recent years. The Farmer-Owned Reserve was used in the late 1970s and early 1980s to isolate excess grain supplies from market channels and to provide a reserve to offset future crop short-falls. Under these programs, eligible producers received government loans on their crops along with annual storage payments, and in return agreed to keep grain off the market for at least three years unless prices rose sharply. If prices were still low at the end of the three-year contractual period, the grain could be forfeited to the government with no interest charge and with no need to repay the accumulated government storage payments or the original government loan.

With the sharp rise in government loan rates for the Farmer-Owned Program in recent years, farmers had an incentive to produce for the reserve. That probably contributed to the sharp increase in U.S. grain carryover stocks. Table 28 shows the reserve loan rates for corn and wheat in recent years and marketing year average cash prices received by U.S. farmers.

While the reserve program is not being phased out completely in 1983, reserve loan rates have been reduced substantially and farmers must hold their 1983 crops for at least nine months before becoming eligible for placement in the reserve. These changes, along with sharply lower plantings, are expected to limit the volume of U.S. grain moving into the Farmer-Owned Reserve in the year ahead and perhaps for the next several years.

The Payment-in-Kind Program is not entirely new. A similar program was used in the early 1960s after U.S. grain stocks rose to unprecedented levels. The 1960s' version provided farmers with government grain or its equivalent in cash in return for reduced plantings. Over a period of years, it effectively reduced U.S. old-crop carryover stocks. At the same time, grain prices were prevented from rising sharply as government grain was returned to the market place to offset reduced production.[12]

With the current program, reduced production is expected to be partially offset by government and Farmer-Owned Reserve stocks that have been isolated from commercial channels in recent years. These stocks are being returned to farmers as PIK grain. With satisfactory growing conditions, market-available supplies are expected to be adequate in the year ahead. Supplies available after mid-1984 will depend on whether the PIK program is repeated in future years.

Implications for Grain-importing Nations

The shift to a Payment-in-Kind Program signals to grain-importing nations that the United States is unwilling to continue absorbing the costs of holding a major portion of the world's grain reserve, or at least is unwilling to continue absorbing the cost levels of recent year. Grain-importing nations not in a position to

carry their own reserve stocks can anticipate increased volatility of grain prices and grain import costs in response to changing world weather and economic conditions. The impact on low-income developing nations could be substantial. For more prosperous areas of the world such as Europe, USSR, the Pacific Rim, and China, the U.S. PIK Program signals an increased incentive to build domestic reserve stocks as an insurance against fluctuating world supplies.

Implications for Other Grain-exporting Nations

For non-U.S. grain-exporting nations, one signal from the Payment-in-Kind Program is that the U.S. is unilaterally attempting to balance world crop production and utilization by sharply curtailing its plantings of grains and cotton. Without strong political pressure from the United States, a logical response of these countries would be to increase their production and exports of major crops in an effort to offset reduced U.S. production. Any signficant increase in world price levels as a result of the Payment-in-Kind Program would provide additional incentive for expanded production by non-U.S. exporters. While the U.S. has urged other nations to avoid boosting grain production, political persuasion may not be totally effective for countries under severe pressure to export for cash-flow reasons. Such cash-flow pressures stem from costs of imported energy, weak non-U.S. currencies, and large outstanding foreign debts. Given the current economic environment, it would not be surprising if the Payment-in-Kind Program at least slightly reduces the U.S. share of world grain, oilseed, and cotton trade.

Impact on U.S. Agribusiness

Initially, the Payment-in-Kind Program likely will reduce the volume of business for many U.S. agricultural input suppliers and some handlers of farm products. The largest immediate impacts are expected to be in the fertilizer, grain storage bin manufacturing, and fuel supply industries, with somewhat smaller impacts on producers of farm equipment and seed. As U.S. farm incomes rise, the farm equipment industry may experience an increased volume of business. Grain elevators and other handlers of grain and oilseeds likely will experience an initial reduction in business volumes as production and total grain supplies decline. U.S. firms in the grain storage business appear likely to face a reduced volume of business for several years because of the sharp rise in on-farm grain storage facilities in recent years and an expected decline in the nation's grain carryover stocks. With excess capacity in much of the grain-related U.S. agribusiness sector, profit margins and total employment in the years immediately ahead may remain well below the levels of the 1970s. These pressures will create strong incentives to increase productivity of U.S. agribusiness and, thus, lower per unit production, handling, and processing costs in the 1980s.

Table 28. U.S. Farmer Owned Reserve Loan Rates for Wheat and Corn, and Marketing Year Average Prices Paid to Farmers, 1977-83 in Dollars Per Bushel.[a]

	Wheat		Corn	
Year	Reserve Loan Rate	U.S. Avg. Farm Price	Reserve Loan Rate	U.S. Avg. Farm Price
1983-84	$4.00	[b]	$2.65	[b]
1982-83	4.00	$3.45	2.90	$2.65
1981-82	3.50	3.65	2.55	2.50
1980-81	3.30	3.91	2.40	3.11
1979-80	2.50	3.78	2.10	2.52
1978-79	2.35	2.97	2.00	2.25
1977-78	2.25	2.33	2.00	2.02

[a]Sources: U.S. Department of Agriculture, Economic Research Service, *Wheat Outlook and Situation* (Washington, D.C.), various issues, *Feed Outlook and Situation* (Washington, D.C.), various issues, and *World Agricultural Supply and Demand Estimates* WASDE-149 (Washington, D.C.), April 22, 1983.

[b]Not available.

Changing Patterns of World Grain Trade

During the 1970s, U.S. shares of world wheat, coarse grain, and rice trade increased substantially. The rising trade shares occurred as U.S. agriculture and the agribusiness sector responded more quickly to growing world demand than most foreign competitors. In 1982-83, however, this trend was reversed. U.S. shares of world trade in all three product groups have dropped significantly below peak levels of 1980-82. As table 29 indicates, the U.S. share of world wheat trade dropped to about 41 percent in 1982-83, from a high of 48.5 percent the previous season. However, that is still well above the 32 percent share in 1971-72. The U.S. share of world coarse grain trade is recovering slightly from the previous season's decline but remains well below peak 1980-81 levels. The U.S. share of world rice trade this season has declined for the second consecutive year and is below the 1971-72 level. In contrast to grains, U.S. shares of world soybean and soybean product exports are increasing slightly in 1982-83, as a result of Brazil's drought-reduced spring 1982 harvest and an early 1983 drought in Argentina.

Wheat Trade Shares

Table 29 shows shares of world trade for major wheat-exporting nations since 1970-71. During the past 12 years, Australia and Canada have experienced significant declines in shares of world wheat trade. The European Community, on the other hand, has captured a sharply rising share of world wheat trade, with its share climbing from 6.2 percent in 1970-71 to an expected record 15.5 percent in 1982-83. The European Community has been an element behind the expanded U.S. government export assistance programs, as the United States attempts to enhance its competitive position relative to the European Community and maintain its share of world wheat exports near the average of the 1972-1982 period.

European Community wheat exports are and have been heavily subsidized for several years in attempts to move excess production into world markets. Surplus European Community wheat production is caused partly by internal price support levels, which are well above world market prices. High price supports encourage production while discouraging domestic consumption. The European Community price support system has an objective of encouraging increased self-sufficiency. U.S. efforts to combat rising European Community market shares through trade subsidies so far have been of questionable success. Large U.S. flour sales to Egypt in 1983 were met by increased European Community wheat sales to the Soviet Union and China, both traditionally important U.S. markets. Also, at this writing European Community policy makers are considering denaturing 2 to 3 million metric tons of wheat for use in domestic livestock feeding.[13] While that may improve U.S. wheat export prospects slightly, it will likely reduce European Community demand for U.S. corn below levels that would otherwise prevail. The European Community traditionally has been one of the largest foreign markets for U.S. corn, and increased wheat feeding there almost certainly will bring reduced corn imports.

As table 29 indicates, Argentina and a group of other smaller grain exporters also have expanded their share of world wheat trade in the past decade. Argentina's share of global trade rose from only 2.9 percent in 1970-71 to 7.7 percent this year, partly because of an exceptionally favorable 1982-83 growing season. Australia's grain belt has one of the most erratic climates of any major grain-producing nation; its fluctuating wheat trade shares reflect large year-to-year variations in crop production.

Table 29. Percentage Shares of World Wheat Trade by Major Exporters, 1970-71 to 1982-83.[a]

Years (July-June)	Argentina	Australia	Canada	EC-10	U.S.	Other[b]
Prelim.						
1982-83	7.7	8.2	21.0	15.5	41.5	6.2
1981-82	4.2	10.8	17.5	15.2	48.2	4.2
1980-81	4.2	11.3	18.1	15.0	44.7	6.1
1979-80	5.6	17.3	17.4	12.1	43.3	3.7
1978-79	4.6	9.3	18.8	12.2	44.9	8.3
1977-78	3.6	15.2	21.8	6.8	43.2	7.9
1976-77	8.9	13.5	20.4	8.1	41.4	6.2
1975-76	4.8	11.8	18.1	12.9	47.5	3.9
1974-75	3.4	13.0	17.5	10.8	43.8	5.2
1973-74	1.8	8.6	18.4	8.3	49.7	5.3
1972-73	5.0	8.3	23.1	8.9	47.2	5.0
1971-72	2.5	16.6	26.1	8.2	32.3	3.4
1970-71	2.9	17.3	21.0	6.2	36.3	2.7

[a]Source: United States Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 21-83 (Washington, D.C.), July 14, 1983; and various other issues.

[b]Does not include USSR. Total of subgroups may not add to 100 due to rounding.

Coarse Grain Trade Shares

As table 30 indicates, the U.S. share of world coarse grain exports rose dramatically in the 1970s, rising from 41.9 percent of global trade in 1970-71 to a record 71 percent in 1979-80. The rising U.S. share during that period indicated American agriculture was responding much more strongly to growing world demand for coarse grains than were other competing exporters. However, in the past two seasons as world trade in these products has declined, U.S. exports have fallen by a greater percentage than those of our competitors, and the U.S. trade share has declined moderately.

U.S. exports of coarse grains far overshadow those of any other major grain-exporting nation, even at their recently reduced level. Argentina is the second largest exporter of coarse grains, but its exports account for only about 12 percent of global trade in the current marketing year. The large U.S. share means that the United States is a major influence on world prices. However, it does not have a monopoly position because the competitors as a group account for nearly 40 percent of world coarse grain trade, and domestic production in importing nations also competes with U.S. exports.

In the past 12 years, all major non-U.S. coarse grain exporters have experienced declining shares of world trade. Thus, the changing U.S. position in world coarse grain markets has been similar to that of the European Community in global wheat exports—except that the U.S. share of world coarse grain exports has risen much more sharply. As with wheat, part of the decline in the U.S. share since its peak in 1979-80 probably can be attributed to a slowing of world trade and the U.S.

Farmer-Owned Reserve Program, which held U.S. supplies out of commercial channels. Most competing exporters do not have reserve programs enabling their producers to keep grain off the market for several years. Instead, cash flow pressures and inadequate storage space generally force foreign producers to empty their grain bins ahead of the upcoming harvest. Producer marketings then are moved into world markets as quickly as possible.

Soybean and Soybean Product Trade Shares

Soybeans

Unlike coarse grains and wheat, the U.S. share of global soybean trade exceeded recent highs during 1982-83. U.S. exports are expected to total 87 percent of all soybeans moved into world markets in the trade year ending in late summer 1983. This season's increased U.S. share has been largely at the expense of Argentina, which experienced a severe drought during its December 1982-March 1983 growing season. During the past seven years, export shares from Brazil and Argentina have fluctuated substantially from year to year because of unstable weather and sizable yearly variations in production. Unlike corn and wheat, the United States does not have a Farmer-Owned Reserve Program for soybeans and, thus, has not directly encouraged farmers to hold large volumes of soybeans out of the world market for long periods of time. This along with South American government incentives for shipping processed products rather than soybeans probably accounts for the continued upward trend in the U.S. share of global soybean trade. With substantial excess soybean processing capacity in Brazil, and expanded processing in Argentina, the U.S. share of world soybean trade appears likely to trend slightly upward in the years immediately ahead.

Soybean Meal

In contrast to soybeans, the U.S. share of global soybean meal trade has drifted downward during the last several years. The United States accounted for about one-third of all soybean meal traded in world markets during 1982-83, with a slightly smaller market share than Brazil. The downward trending U.S. trade share reflects substantial government incentives, which encourage soybean processing in Brazil and Western Europe. Brazil's incentives for processing soybeans and exporting the resulting products have incuded: (1) a higher export tax on unprocessed soybeans than on soybean products, (2) use of export quotas and licenses on soybeans from time to time to insure adequate supplies for domestic processors, (3) subsidized interest rates for processors, and (4) duty-free imports of machinery used in production of export goods. Brazilian export tax rates and export quotas vary substantially from year to year depending on world market conditions and the size of the domestic soybean crop. At times, Brazil has used export embargoes and has imported soybeans to insure adequate domestic supplies. Embargoes were applied in 1974, 1977, and 1979.[14]

In the European Community, there are no tariffs on imported soybeans and soybean meal; these products are available to European Community users at world prices. Corn and other grains, however, are supported at prices sharply above world levels by variable levies or variable tariffs on imports. One result is that soybean meal in the European Community is priced much lower in relation to corn than in the United States. Relatively inexpensive soybean meal has encouraged sharply increased European Community utilization during the last decade, with grains accounting for declining shares of typical European Community livestock and poultry rations. The European Community applies a modest import tax to soybean oil imports.[15] This tends to favor imports of beans for processing, rather than importing of both meal and oil. With these trade policies and growing internal demand, the European Community soybean-processing industry expanded sharply in the 1970s and early 1980s. Soybean meal exports shown in table 32 reflect the community's expanded processing capacity using mainly U.S. soybeans.

Table 30. Percentage Shares of World Coarse Grain Exports By Major Exporters, 1970-71 to 1982-83.[a]

Marketing Year (July-June)	Argentina	Australia	Canada	S. Africa	Thailand	U.S.	West Europe	Others[b]
Prelim. 1982-83	12.2	1.5	7.0	3.7	2.8	59.9	7.1	5.5
1981-82	13.2	3.3	7.4	4.8	3.1	59.4	5.7	3.1
1980-81	9.4	2.1	4.4	3.4	2.3	68.9	6.3	3.3
1979-80	6.5	4.1	4.8	2.9	2.3	71.0	5.6	2.9
1978-79	12.7	2.9	4.3	3.2	2.5	63.1	6.9	3.3
1977-78	13.1	2.4	4.4	3.5	1.5	62.0	7.1	4.8
1976-77	11.5	4.0	5.6	1.7	2.8	61.3	5.6	5.1
1975-76	7.1	4.2	6.4	4.5	3.4	60.6	6.5	7.5
1974-75	13.3	5.0	4.4	5.5	3.4	53.3	7.0	5.9
1973-74	11.8	2.7	4.1	0.7	3.2	62.6	7.7	6.2
1972-73	7.0	2.7	7.1	5.6	1.9	59.9	8.6	6.2
1971-72	12.7	6.6	9.4	6.4	4.7	42.7	10.7	5.1
1970-71	16.4	4.8	9.1	2.4	3.9	41.9	8.9	10.4

[a]Source: United States Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 21-83 (Washington, D.C.), July 14, 1983; and various other issues.

[b]Does not include USSR. Total of subgroups may not add to 100 due to rounding.

Table 31. Percentage Shares of World Soybean Trade by Major Exporters, 1975-76 to 1982-83.[a]

Years (Oct.-Sept.)	Argentina	Brazil	EC-10	Paraguay	U.S.	Other[b]
Prelim. 1982-83	4.5	3.9	0.6	1.8	87.7	1.2
1981-82	6.8	2.8	0.7	2.5	86.6	0.9
1980-81	10.9	6.8	0.6	2.1	78.3	1.4
1979-80	8.3	4.4	1.1	1.5	83.7	1.0
1978-79	11.3	2.6	1.4	1.4	81.5	1.8
1977-78	8.8	3.7	1.1	0.9	84.7	1.0
1976-77	3.0	13.9	0.6	1.3	80.1	1.1
1975-76	0.6	17.4	1.0	1.1	78.5	1.5

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds, and Products*, FOP 5-83 (Washington, D.C.), May 1983; FOP 11-82 (Washington, D.C.), September 1982; FOP 16-81 and FOP 10-80 (Washington, D.C.), September 1981; FOP 1-81 (Washington, D.C.), January 1981; and FOP 10-80 (Washington, D.C.), May 1980.

[b]Totals may not add due to rounding.

Table 32. Percentage Shares of World Soybean Meal Trade by Major Exporters, 1975-76 to 1982-83.[a]

Years (Oct.-Sept.)	Argentina	Brazil	EC-10	U.S.	Other[b]
Prelim. 1982-83	4.4	36.4	21.1	32.8	5.3
1981-82	3.8	39.5	21.6	30.4	4.8
1980-81	2.1	43.4	19.5	31.0	3.9
1979-80	2.0	31.7	20.7	41.6	4.0
1978-79	2.5	35.2	20.1	38.7	3.5
1977-78	2.2	41.4	17.6	36.2	2.6
1976-77	2.5	41.5	16.3	37.2	2.5
1975-76	2.2	37.2	16.9	41.4	2.2

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds, and Products*, FOP 5-83 (Washington, D.C.), May 1983; FOP 11-82 (Washington, D.C.), September 1982; FOP 16-81 (Washington, D.C.), September 1981; FOP 1-81 (Washington, D.C.), January 1981; and FOP 10-80 (Washington, D.C.), May 1980.

[b]Totals may not add to 100 due to rounding.

Table 33. Percentage Shares of World Soybean Oil Trade by Major Exporters, 1975-76 to 1982-83.[a]

Years (Oct.-Sept.)	Argentina	Brazil	EC-10	Paraguay	U.S.	Other[b]
Prelim. 1982-83	5.4	24.8	25.6	11.3	26.9	5.0
1981-82	4.0	25.2	26.8	13.3	26.2	4.4
1980-81	2.0	36.5	24.9	11.9	21.4	3.4
1979-80	3.2	16.3	27.6	11.6	38.1	3.2
1978-79	1.8	18.8	31.3	10.5	35.7	2.0
1977-78	2.5	24.2	28.9	9.8	33.4	1.2
1976-77	2.9	20.8	32.9	6.8	35.6	1.3
1975-76	3.8	25.4	36.2	7.4	26.2	1.2

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds, and Products*, FOP 5-83 (Washington, D.C.), May 1983; FOP 11-82 (Washington, D.C.), September 1982; FOP 16-81 (Washington, D.C.), September 1981; FOP 1-81 (Washington, D.C.), January 1981; and FOP 10-80 (Washington, D.C.), May 1980.

[b]Totals may not add due to rounding.

Soybean Oil

As with soybean meal, the U.S. share of world soybean oil trade has declined modestly during the last few years. The declining share reflects increased soybean processing in Argentina, Brazil, and Spain. In contrast to soybean meal, the European Community's share of global soybean oil exports actually has declined moderately since the mid-1970s. The downward trend reflects increased community consumption of soybean oil, and export availabilities which have not kept pace with the growth of world soybean oil trade. The increased consumption is caused partly by changing consumer tastes and a shift from more traditional fats and oils. In contrast to European Community trends, Spain's share of global soybean oil exports has risen significantly since the mid-1970s. Spain's vegetable oil needs continue to be filled to a large extent by olive oil. Rapid growth of Spanish soybean meal demand has generated increased processing capacity with excess oil production being moved into world markets.

In the years immediately ahead, the U.S. share of world soybean oil trade appears likely to fluctuate moderately from year to year with a slight downward trend. Annual fluctuations will result from changing South American production, with the expected downward trend reflecting anticipation of a continued rise in Brazilian and Argentine soybean output and government incentives for expanded processing in South America and Western Europe.

Trade Shares in Livestock Product Exports

Beef and Veal Trade

Table 34 shows the dramatic changes that have occurred in major exporters' shares of world beef and veal trade. In 1970, Argentina was the world's top ranking beef exporter. By 1982 it had dropped to a third place position behind Australia and the European Community. The most dramatic change was a near-doubling of the European Community's beef and veal trade share (including trade within the community) during the 1970s. Australia's share of world beef and veal trade increased some during the last half of the decade before declining again during the early 1980s. Brazil has become a more significant beef and veal exporter during the last few years, while the United States and Canada continue to hold only a minor share of world trade. World beef

Table 34. Percentage Shares of World Beef and Veal Trade by Major Exporters.[a]

Calendar Year	Argentina	Australia	Brazil	Canada	EC-10	New Zealand	U.S.	Uruguay	Others
Proj. Prelim.									
1983	11.4	14.2	8.7	2.0	35.7	7.2	2.8	3.9	14.1
1982	11.2	20.2	7.4	1.8	33.9	7.6	2.5	3.6	11.5
1981	10.8	15.7	6.2	1.8	38.6	7.7	2.2	3.9	13.2
1980	10.6	19.0	3.8	1.5	39.5	7.8	1.8	2.6	13.3
1979	15.6	24.4	2.5	1.2	32.2	7.7	1.7	1.8	13.0
1978	16.9	25.9	3.0	1.0	29.6	7.9	1.7	2.6	11.4
1977	13.9	25.4	4.6	1.2	30.4	9.2	1.1	3.1	11.0
1976	13.9	22.4	4.1	1.5	30.4	10.0	1.1	5.1	11.4
1975	8.1	22.7	3.1	0.6	38.9	9.3	0.7	3.4	13.2
1974	11.0	18.0	3.8	1.0	38.5	9.6	1.1	4.4	12.7
1973	16.5	25.6	5.1	1.2	22.3	9.3	1.2	3.5	15.2
1972	21.6	22.1	7.0	1.2	19.9	8.4	0.9	3.5	15.4
1971	17.2	20.1	5.7	1.9	24.3	10.9	0.9	3.3	15.8
1970	24.7	17.3	4.3	1.9	21.2	9.4	0.6	5.8	14.8

[a]Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry Situation*, FL&P 2-83 (Washington, D.C.), May 1983; *Foreign Agriculture Circular, Livestock and Meat*, FLM 2-81 (Washington, D.C.), February 1981; FLM 2-80 (Washington, D.C.), February 1980; FLM 10-78 (Washington, D.C.), September 1978; and FLM 9-78 (Washington, D.C.), September 1978.

[b]Totals may not add due to rounding.

and veal trade is composed primarily of lower quality products rather than highly finished beef common in North America.

The U.S. share of world beef and veal trade may continue its slight upward trend during the next few years. However, resistance from livestock feeders in other industrial nations appears likely to continue restraining the U.S. share in the years ahead.

Pork Trade

As table 35 indicates, the U.S. share of world pork trade modestly exceeds its beef trade share. After rising abruptly in the mid-1970s, the U.S. share of global pork exports has held relatively steady in the 5 to 6 percent range. The European Community remains the world's largest pork exporter (including trade within the community) with its share of the world trade holding relatively constant in the past 12 years. Eastern Europe's share declined modestly in 1982, partly in response to heavy debt burdens and limited ability to import coarse grains for livestock feeding. As with beef, the U.S. share of world pork trade may increase slightly in the years ahead. However, restrictive trade practices of importing nations and resistance of foreign producers will likely limit the increases.

Table 35. Percentage Shares of World Pork Trade by Major Exporters.[a]

Calendar Year	Canada	E. Europe	EC-10	U.S.	Others[b]
Proj. Prelim.					
1983	7.2	13.9	70.6	3.5	4.8
1982	7.0	14.4	70.1	3.6	4.9
1981	4.6	16.9	69.6	5.0	3.9
1980	4.7	17.6	70.0	4.4	3.4
1979	3.3	16.7	71.0	5.5	3.5
1978	2.6	16.8	70.4	5.9	4.2
1977	2.2	15.1	70.0	6.5	6.2
1976	2.0	11.9	70.8	7.5	7.8
1975	2.2	13.3	73.0	5.2	6.3
1974	2.3	11.3	76.0	2.6	7.8
1973	2.9	12.4	69.6	3.9	11.2
1972	2.8	15.7	69.0	2.6	10.0
1971	2.4	15.6	73.2	1.8	7.0
1970	2.1	15.5	74.2	2.0	6.2

[a]Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Poultry*, FL&P 1-82 (Washington, D.C.), April 1982; *Foreign Agriculture Circular, Livestock and Meat*, FLM 2-81 (Washington, D.C.), February 1981; FLM 2-80 (Washington, D.C.), February 1980; FLM 10-78 (Washington, D.C.), September 1978; and FLM 9-78 (Washington, D.C.), September 1978.

[b]Totals may not add due to rounding.

Soviet Grain and Oilseed Importing Patterns

The Soviet Union is a key indicator of world grain trade and grain price movements. Its extreme importance in year-to-year fluctuations of world grain exports is shown in table 36. In the past five years, the Soviet share of world grain imports has fluctuated from 9 to 21 percent with preliminary estimates placing the 1982-83 share at 17 percent. In other words, the Soviet Union often has been the destination for nearly one bushel out of every five traded in world markets. Table 36 shows the large year-to-year variation in Soviet grain production with large variations in grain imports in most years. Beginning with the 1981 crop, the Soviet Union stopped publishing official estimates of the size of its grain harvests. U.S. Department of Agriculture estimates indicate Soviet production dropped sharply in 1981—which could account for the large increase in 1981-82 imports. Production in 1982 is estimated to have been moderately above the previous year and probably is the main reason for a decline in 1982-83 Soviet imports. Reduced Soviet imports in turn are responsible for much of this season's decline in world grain trade.

Table 37 shows U.S. and non-U.S. exports of grains, soybeans, and soybean meal to the Soviet Union in the past eight years. Preliminary estimates place the 1982-83 U.S. share of Soviet grain trade at 21 percent, down from a high of 78 percent in the mid-1970s and down from 34 percent the previous season. The U.S. share of Soviet soybean imports has dropped even more sharply, from a high of 93 percent in 1977-78 to an expected 13 percent in 1982-83. In the past eight years, the U.S. has exported only minor quantities of soybean meal to the Soviet Union and that pattern is continuing in 1982-83. The sharply lower U.S. share of Soviet grain and soybean trade almost certainly is due in large part to U.S. partial embargoes and trade sanctions. To a limited extent in 1982-83, it may also reflect the availability of credit for purchases from Canada and significant price-cutting by Argentina.

Table 38 shows the major suppliers of grain to the Soviet Union during the past decade. Much of the recent decline in the U.S. share of Soviet grain imports reflects sharply higher purchases from Argentina and Canada. Argentina's grain exports to the Soviet Union rose from only 0.3 million metric tons as recently as 1976-77 to 13.3 million tons in 1981-82. During the same period, Canada's exports to the Soviet Union increased from 1.4 million tons to 9.2 million. Throughout the period, the European Community and Australia made only modest sales to the Soviets. The "others" category includes such nations as India, Turkey, Brazil, Spain, and Thailand.

In examining the impact of larger minimum quantities in a new U.S.-USSR Grain Agreement, it is important to recognize the potential changes in trading patterns of other major grain exporters. For example, suppose the minimum required U.S. sales level to the Soviet Union were high enough to reduce Argentina's Soviet sales substantially below recent years. Argentina is not in a position to curtail production or store grain for long periods of time, and almost certainly would sell more of its grain elsewhere in world markets. Thus, the United States would gain additional sales to the Soviet Union but would likely lose sales in other foreign markets from increased competition with Argentine grain. Similar logic can be applied to reactions of other grain exporters. For this reason, the impact of Soviet purchases on U.S. grain exports depends much more on that nation's total imports of grain from all sources than on the individual U.S. market share.

In the past two years, the Soviet Union has expanded or renewed longer term grain purchase agreements with Canada, France, Argentina, Australia, and Brazil. These agreements, along with a similar U.S.-USSR trade pact, indicate the Soviets expect to continue as a major grain importer in the years immediately ahead. For political as well as economic reasons, the Soviet Union likely will continue to diversify its source of grain and oilseed purchases but will remain a significant buyer of U.S. corn, wheat, and probably soybeans. And with highly variable crop production, the Soviet Union almost certainly will remain a potentially important influence on world grain trade and U.S. grain prices for the remainder of the 1980s.

Table 36. The Soviet Role in Fluctuating World Grain Trade.*

	Millions of Metric Tons Change From Previous Year in:			
Year	Soviet Grain Production	Soviet Grain Imports	World Grain Trade	Soviet Percentage Share of World Grain Trade
1970-71	+25	− 0.5	+12.3	0.07
1971-72	− 6	+ 7.0	+ 0.2	7
1972-73	−13	+13.1	+24.7	18
1973-74	+55	−11.5	+ 7.1	8
1974-75	−27	− 5.6	− 5.0	4
1975-76	−56	+20.4	+13.5	18
1976-77	+84	−15.1	+ 6.4	7
1977-78	−28	+ 7.9	+ 9.8	12
1978-79	+41	− 3.3	+ 7.6	9
1979-80	−58	+15.4	+25.7	16
1980-81	+10	+ 3.8	+13.0	17
1981-82	−29	+11.2	+ 4.6	21
Est. 1982-83	+20	−12	−13.1	17

*Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 25-76 (Washington, D.C.), October 7, 1976; FG 4-83 (Washington, D.C.), February 15, 1983; and FG 10-83 (Washington, D.C.), April 12, 1983.

Table 37. Soviet Grain Soybean and Soybean Meal Importing Patterns in Millions of Metric Tons, 1975-76 Through 1982-83.[a]

	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	Est. 1982-83
Wheat Imports:[b]								
U.S. Origin	4.0	2.9	3.3	2.9	3.9	4.0	6.8	3.5
Non-U.S. Origin	6.1	1.7	3.3	2.2	8.1	12.0	12.5	17.5
Total	10.1	4.6	6.6	5.1	12.0	16.0	19.5	21.0
Feed Grain Imports:[b]								
U.S. Origin	9.9	4.5	9.2	8.3	11.3	4.0	8.6	3.5
Non-U.S. Origin	5.7	1.2	2.5	1.7	7.1	14.0	16.0	9.5
Total	15.6	5.7	11.7	10.0	18.4	18.0	25.5	13.0
Total Imports, Wheat and Coarse Grains	25.7	10.3	18.4	15.1	30.4	34.0	45.0	34.0
Percentage from U.S. Origin	54%	72%	78%	74%	50%	24%	34%	21%
Soybean Imports:[c]								
U.S. Origin	0.31	0.91	0.85	1.18	0.81	.0	0.71	0.2
Non-U.S. Origin	1.37	0.55	0.06	0.59	0.28	1.4	0.99	1.3
Total	1.68	1.46	0.91	1.77	1.09	1.4	1.7	7.5
Percentage from U.S. Origin	18%	62%	93%	67%	74%	0.0	42%	13%
Soybean Meal Imports:[c]								
U.S. Origin	0.0	0.08	0.0	0.05	0.0	0.0	0.0	0.0
Non-U.S. Origin	0.0	0.0	0.0	0.57	0.44	1.00	1.7	2.6
Total	0.0	0.08	0.0	0.52	0.44	1.00	1.7	2.6

[a]Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982; FG 10-83 (Washington, D.C.), April 12, 1983; *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-81 (Washington, D.C.), March 1981; FOP 9-82 (Washington, D.C.), July 1982; FOP 4-83 (Washington, D.C.), April 1983; U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), October 6, 1978, October 19, 1979, and October 3, 1980; U.S. Department of Agriculture, Agricultural Marketing Service, *Feed Market News* (Independence, Missouri), December 28, 1978, and December 3, 1980; and U.S. Department of Agriculture, Foreign Agricultural Service, *U.S. Export Sales* (Washington, D.C.), June 4, 1982.

[b]July-June trade years.

[c]October-September marketing years.

Table 38. Grain Exports to USSR by Origin, 1972-73 Through 1981-82 July-June Trade Years in Millions of Metric Tons.[a]

Area of Origin	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82
U.S.	13.7	7.9	2.3	13.9	7.4	12.5	11.2	15.2	8.0	15.4
Argentina	0.1	0.3	1.8	1.4	0.3	2.7	1.4	5.5	11.2	13.3
Canada	5.1	1.8	0.3	4.5	1.4	1.9	2.1	3.5	6.9	9.2
Australia	0.9	0.1	0.9	2.0	0.5	0.3	0.1	3.9	2.9	2.5
European Community	1.9	0.5	0.1	0.5	0.2	0.2	0.2	0.8	1.1	2.2
Others	0.8	0.3	0.1	3.0	0.3	0.9	0.1	1.5	3.9	2.2
Total	22.5	10.9	5.2	25.7	10.3	18.4	15.1	30.4	34.0	44.8

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 20-80 (Washington, D.C.), July 11, 1980 and FG 10-83 (Washington, D.C.), April 12, 1983.

How Grain Feeding Levels in Other Nations Compare with Soviet Union

Table 39 shows the Soviet Union's changing percentage shares of world grain feeding during the 1970s and comparisons with other leading grain feeding nations. Soviet feeding of all grains rose by nearly one-third from 1972-73 to 1979-80 but its share of global grain feeding increased only marginally. In other words, the expansion rate for Soviet grain feeding was only slightly greater than that for the world as a whole. In the same period, U.S. grain feeding declined slightly. In 1979-80, U.S. livestock and poultry producers accounted for about one bushel out of every four being fed in the world, down from a 32 percent share in 1972-73. U.S. and Soviet grain-feeding shares were nearly equal by 1979-80, with the two nations together being responsible for approximately half of the world's grain feeding. The next eight top ranking grain-feeding nations together accounted for approximately one-fourth of all global grain feeding.

During the past three years, the Soviet Union appears to have placed greater emphasis on improved feed conversion efficiency in its livestock and poultry industries. Soviet grain feeding in 1982-83 is estimated to be 6 percent below its peak 1978-79 level, despite a small increase in livestock, poultry, and dairy production. Further significant improvements in Soviet grain feeding efficiency are possible in the years ahead through (1) increased attention to rations containing optimum levels of protein, amino acids, minerals, growth stimulants, and other feed efficiency factors; (2) genetic improvements in livestock and poultry; (3) improved crop handling and reduced losses from spoilage; and (4) better management of feeding operations. Soviet feed requirements per unit of meat produced continue to be well above those of Western Europe and the United States. Yet, economic pressures from large grain imports appear likely to bring greater Soviet emphasis on feeding efficiency as well as on increased domestic grain production.

Table 39. Comparative Role of USSR and U.S. in World Grain Feeding, 1972-73, 1976-77, and 1979-80.[a]

	1972-73		1976-77		Prelim. 1979-80	
	Mil. Metr. Tons Grain Fed	Percent Share of World Grain Feeding[b]	Mil. Metr. Tons Grain Fed	Percent Share of World Grain Feeding[b]	Mil. Metr. Tons Grain Fed	Percent Share of World Grain Feeding[b]
U.S.	147.8	32	115.1	25	139.2	26
USSR	94	21	101.5	22	123.0	23
W. Germany	15.8	3	16.8	4	16.0	3
Canada	18.0	4	16.7	4	18.0	3
Poland	14.2	3	16.6	4	19.3	4
France	17.0	4	16.2	4	18.8	4
Japan	10.4	2	13.3	3	16.7	3
Brazil	10.1	2	13.1	3	15.8	3
U.K.	14.0	3	12.7	3	12.1	2
Spain	9.6	2	11.9	3	13.6	3
Total	332.9	73	333.9	72	392.5	73

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, "Utilization of Grain for Livestock Feed," FG 14-80 (Washington, D.C.), May 1, 1980 and FG 14-77 (Washington, D.C.), August 23, 1977.

[b]Totals may not add due to rounding.

Production and Trade Developments in People's Republic of China

During the five years ending in 1982, Chinese production of feed grains, food grains, and oilseeds expanded substantially through greater use of available production technology and government incentives encouraging specialization and increased production. Meat production expanded by about 68 percent, moderately exceeding growth of the available feed supply (see table 40). As a result, Chinese imports of coarse grains and wheat from all sources nearly doubled during the same time period.[6] In the near future, additional government incentives are expected to boost grain production significantly with slower growth of grain imports anticipated into the mid to late 1980s if Chinese weather patterns remain favorable.

Purchases of U.S. Grain

During the past decade, the U.S. share of Chinese grain imports fluctuated from a zero share in the mid-1970s to nearly two-thirds of all Chinese grain imports in 1973-74, 1980-81, and 1981-82 (see table 40). Important traditional competitors in the Chinese market include Canada and Australia, with Argentina and the European Community becoming major suppliers in the 1982-83 trade year. The U.S. share of Chinese grain imports has been influenced by the political environment as well as available supplies and trade incentives provided by other exporters. During 1982-83, slightly less than half of China's grain import needs are expected to be filled with U.S. grain. Much of the decline in the U.S. share reflects increased Chinese purchases from Argentina and the European Community. Increased European Community sales reflect substantial export subsidies, perhaps partly in retaliation for a large, heavily subsidized U.S. flour sale to Egypt, a traditional outlet for European Community flour. Increased Argentine sales reflect that country's unusually large 1982-83 wheat crop and debt burdens forcing it to place heavy emphasis on grain exports as a means of earning foreign exchange.

In the years just ahead, China is expected to continue purchases of American grain at the level called for in its grain trade agreement with the United States. The agreement was signed in 1980 and provides for at least 6 to 9 million metric tons of U.S. grain sales annually to China through 1984. Prospects for sales above this level will depend on year-to-year changes in China's domestic production, and the cost and availability of grain from other exporters.

U.S. Soybean Purchases

In January 1983, the U.S. Congress restricted imports of Chinese textile goods in an effort to limit pressures from foreign competition on U.S. industry. Textile exports are an important source of foreign exchange earnings, which China uses to pay for purchases of U.S. soybeans and soybean products, grains, and other imports. In reaction to the U.S. restrictions, China halted all purchases of U.S. soybeans and soybean products. These commodities are not included in the U.S.-China grain agreement, so the action did not break any previous trade commitments.[7]

As table 41 indicates, China has purchased modest amounts of U.S. soybeans and soybean oil during recent years. Its 1979-80 purchases represented 3.6 percent of all U.S. soybean exports and 8.2 percent of soybean oil exports. However, U.S. sales of soybeans and soybean products to China dropped sharply during the next two seasons and have fallen to zero in 1982-83.

China appears likely to remain a modest importer of soybeans and soybean oil during the next few years as its domestic demand growth matches or slightly exceeds production growth. Import levels will vary from year to year with annual changes in Chinese production of soybeans and other oilseeds. Until the U.S.-China trade dispute is resolved, China's import needs probably will be filled largely with South American soybeans and soybean products. However, lack of trade with China wil not necessarily reduce the total level of U.S. soybean product exports. China will absorb South American soybeans that otherwise would compete with U.S. products in such markets as Europe and Japan.

Table 40. Sources of Chinese Grain Imports, July-June Trade Years, 1972-73 Through 1980-81 in Millions of Metric Tons.[a]

Source	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	Proj. 1982-83
Canada	4.4	1.4	2.4	1.2	1.9	3.3	3.2	2.6	[b]	[b]	4.2
Australia	0.3	1.2	1.5	1.0	0.8	4.6	1.4	3.7	1.2	2.0	0.6
Argentina	0.1	0.2	0.7	0	0.5	0.5	1.1	0.5	[b]	[b]	2.3
E.C.	0	0	0.2	0	0	0	0	0.1	0.4	0.1	1.5
Thailand	0	0	0	0	0	0	0.1	0.1	[b]	[b]	0
U.S.	1.5	5.0	1.5	0	0	0.3	5.4	4.0	8.9	9.3	6.9
Total	6.2	7.9	6.2	2.2	3.2	8.7	11.1	10.9	14.6	14.5	15.5
U.S. As % of Total	24	63	24	0	0	3	49	37	61	64	49
Canada as % of Total	71	18	39	55	59	38	29	24	[b]	[b]	27

[a]Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 5-81 (Washington, D.C.), January 28, 1981; FG 6-83 (Washington, D.C.), February 25, 1983; *U.S. Export Sales* (Washington, D.C.), May 26, 1983; Reuter News Wire, "China Grain Imports Seen Higher," (London, England), March 28, 1983; "Canada, China Sign Three-Year Wheat Pact" (London, England), May 5, 1983; American Quotations Systems Wire (Kansas City, Missouri), April 12, 1983; and Carolyn Whitton, "China Market: Import Growth Slowing," U.S. Department of Agriculture, Economic Research Service, *Agricultural Outlook* (Washington, D.C.), April 1983, pp. 22-23.

[b]Data not available.

Concessional and U.S. Government-financed Export Programs

U.S. involvement in food export assistance programs can be traced to the 1920s. However, most current programs stem from the Agricultural Development and Assistance Act of 1954 (Public Law 480). This legislation originally was enacted to (1) help dispose of U.S. food surpluses, (2) assist countries lacking foreign exchange, and (3) facilitate U.S. foreign aid efforts in Europe and elsewhere. Since the mid-1960s, increased emphasis has been placed on development of foreign commercial markets for U.S. farm products and reduction of world hunger and malnutrition. During the last 14 years, Western Europe and Japan have become extensively involved in similar efforts. As a result, the U.S. share of world food aid dropped to an average of 60 percent in the 1974 through 1979 period—down from over 90 percent prior to 1969.[18]

Types of Programs

U.S. Concessional and Government-financed Export Programs fall into three main categories: PL-480 Title I and Title II, and AID programs. PL-480 Title I exports prior to 1971 involved some sales for local currencies. More recently, this program has provided long-term low interest credit with repayment periods up to 40 years and a grace period of up to 10 years. Repayments may be either in U.S. dollars or other currencies readily convertible to dollars.[19] By law, three-fourths of all food exports under Title I are required to go to countries with a per capita GNP of $730 or less per year. Before fiscal 1982, the GNP requirement was $680 per year.[20] Title II involves donations of food for export. About two-thirds of the food exports under Title II of the PL-480 program normally are shipped by voluntary relief agencies. In fiscal year 1982, an additional 27 percent was contributed from the World Food Program and 9 percent was government-to-government exports. India has been a major recipient of Title II agricultural exports and received over 22 perent of such shipments in fiscal year 1982.[21]

The AID (Agency for International Development) program was begun in 1979 to extend financial loans and grants for commodity purchases. Initially, Israel was a major recipient of such financing, with increased emphasis being given to Egypt and Sudan during the past two years.[22] Figure 4 shows exports under these government and concessional export programs during the past two decades in relation to total U.S. agricultural exports. These programs have accounted for only a small percentage of all U.S. farm product exports. Table 42 (on page 39) and the appendix show the distribution of exports under concessional programs by commodities during the past six years. Most concessional exports have involved soybean oil, wheat and flour, and nonfat dry milk.

U.S. Government Loan Guarantees for Export Financing

In addition to concessional exports, the U.S. government in recent years has encouraged agricultural exports through Commodity Credit Corporation (CCC) loan guarantees to foreign buyers who have difficulty obtaining commercial credit. Under this program, short- or intermediate-term credit is provided by private lending institutions for purchases of agricultural commodities. The CCC, an agency of the U.S. government, guarantees repayment of the loans. The repayment rate on such loans generally has been excellent, except for a few recent exceptions. Trade sources report the CCC has made payments on some loans to Poland during the past two years, because of Poland's severe financial problems. Because of Mexico's 1982-83 financial crisis, over $1 billion in CCC credit guarantees were extended during the 1982-83 trade year for Mexican purchases of U.S. corn, grain sorghum, wheat, soybeans, and other farm products.

In addition to CCC credit guarantees, the U.S. government initiated the Blended Credit Program in 1982-83 to encourage expanded farm product exports. The program involves blending of interest-free loans with CCC credit guarantees, with the result being loans to needy nations at interest rates 20 percent below commercial levels. Interest-free loans are provided through CCC's GSM-5 program, with the credit guarantees covering 98 percent of the principal and up to 8 percentage points of interest through CCC's GSM-102 program. Initial CCC authorizations for the 1982-83 fiscal year provided $500 million for Blended Credit along with $3.4 billion for other types of CCC credit.[23] Wheat, flour, and soybean oil have been given heavy emphasis under the Blended Credit Program. Efforts are being made to insure that sales are beyond levels which recipient countries otherwise would have purchased. The Blended Credit Program has been presented as a tool for expanding the U.S. share of world food trade and for competing with subsidized exports of other nations, particularly the European Community. These objectives will be fully achieved only if other exporters fail to respond with their own expanded export incentive programs and choose to curtail production or store surplus agricultural products.

Table 41. Chinese Purchases of U.S. Soybeans and Soybean Oil As Percentages of Total U.S. Exports 1977-78 Through 1981-82 Marketing Years.*

Year	Mil. Bushels U.S. Soybeans	% of U.S. Total Soybean Exports	Chinese Soybean Oil Purchases, % of U.S. Total Exports
1981-82	13.5	1.5	0
1980-81	18.2	2.5	3.5
1979-80	31.4	3.6	8.2
1978-79	6.3	0.9	5.6
1977-78	3.2	0.5	11.4

*Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November-December 1982 and various other issues.

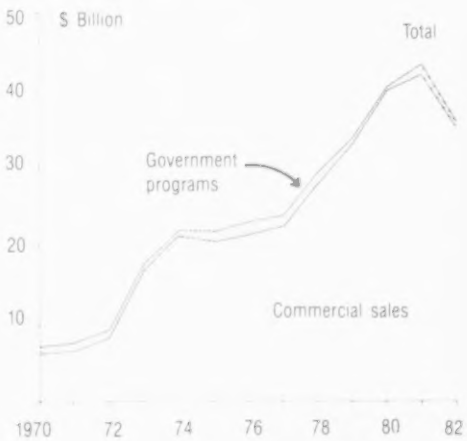


Figure 4. Dollar Value of U.S. Agricultural Exports Under Government Programs and Commercial Sales, 1970-1982 Calendar Years.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), March-April 1983 and various other issues.

Role and Composition of U.S. Agricultural Trade

Despite two years of declining exports, U.S. farm product exports continue to play an important role in the U.S. economy. Earnings from agricultural exports in fiscal 1981-82 totaled $39.1 billion, down 11 percent from the 1981-82 record but were 63 percent larger than five years earlier. These exports provided jobs in the farm supply sector as well as in transportation, wholesaling, processing, and grain-handling industries. Agricultural exports also continue to provide an important source of income for the nation's farmers. But their impact goes substantially beyond agriculture. Farm product exports, in a very real sense, help to pay for the nation's imports of key raw materials, such as petroleum, and the wide range of imported manufactured products purchased by U.S. consumers. As shown in figures 5 and 6, the U.S. still has a substantial surplus in its balance of agricultural trade. This surplus has helped offset a large deficit in the non-agricultural trade sector enabling the U.S. dollar to be stronger than it might otherwise have been. A strong U.S. dollar helps to hold down the cost to U.S. consumers for imported products. Thus, American consumers have an important stake in maintaining healthy export markets for the nation's agricultural abundance.

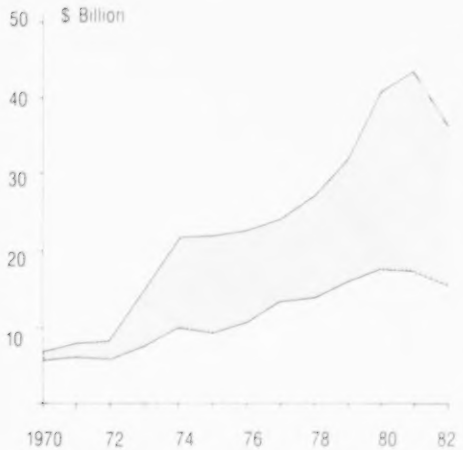


Figure 5. Dollar Value of U.S. Agricultural Exports and Imports, 1970-1982.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1983 and various other issues.

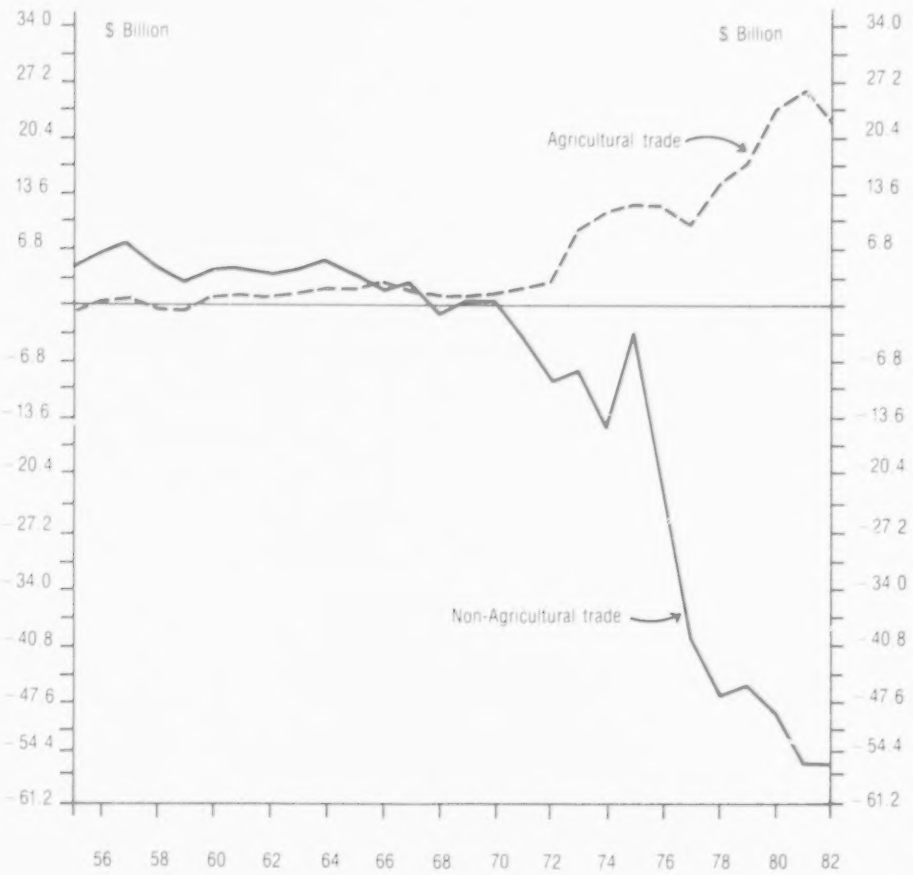


Figure 6. Net U.S. Trade Balance in Agricultural and Non-Agricultural Products by Calendar Years, 1956 through 1982.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1983 and various other issues.

U.S. agricultural imports in 1981-82 totaled $15.4 billion. That left a net surplus of $23.7 billion in agricultural trade. Five years earlier, the U.S. agricultural trade surplus was only $10.6 billion. The 1982-83 trade surplus is expected to decline to about $18.3 billion, but still is equivalent to one-third of the nation's $59.4 billion petroleum import costs in 1982.[24]

Farm Product Exports by Commodity Groups

Grains, feeds, oilseeds, and oilseed products make up about two-thirds of the value of U.S. agricultural exports, as figure 7 indicates. During the five years before September 30, 1982, these exports grew in value by 70 percent. U.S. exports of all livestock, meat, dairy, and poultry products totaled $4.1 billion or 10 percent of the nation's total farm product exports. Exports of these commodities grew by 59 percent during the past five years. An additional $8.7 billion or 22 percent of U.S. agricultural exports during fiscal 1981-82 consisted of cotton, tobacco, fruits, nuts, and vegetables.

Previous issues of this report have shown that foreign trade requires a two-way exchange between nations. Over the longer term, to obtain foreign exchange for purchases of American exports, other nations must sell products to the United States. In this process, trading partners often concentrate on exporting products that can be produced most efficiently at home, and import products that can be produced more economically by their trading partners. Through this process, both partners may benefit from trade.[25] While the United States is a large net exporter of farm products, it also imports sizable quantities of agricultural commodities because of this principle of comparative advantage.

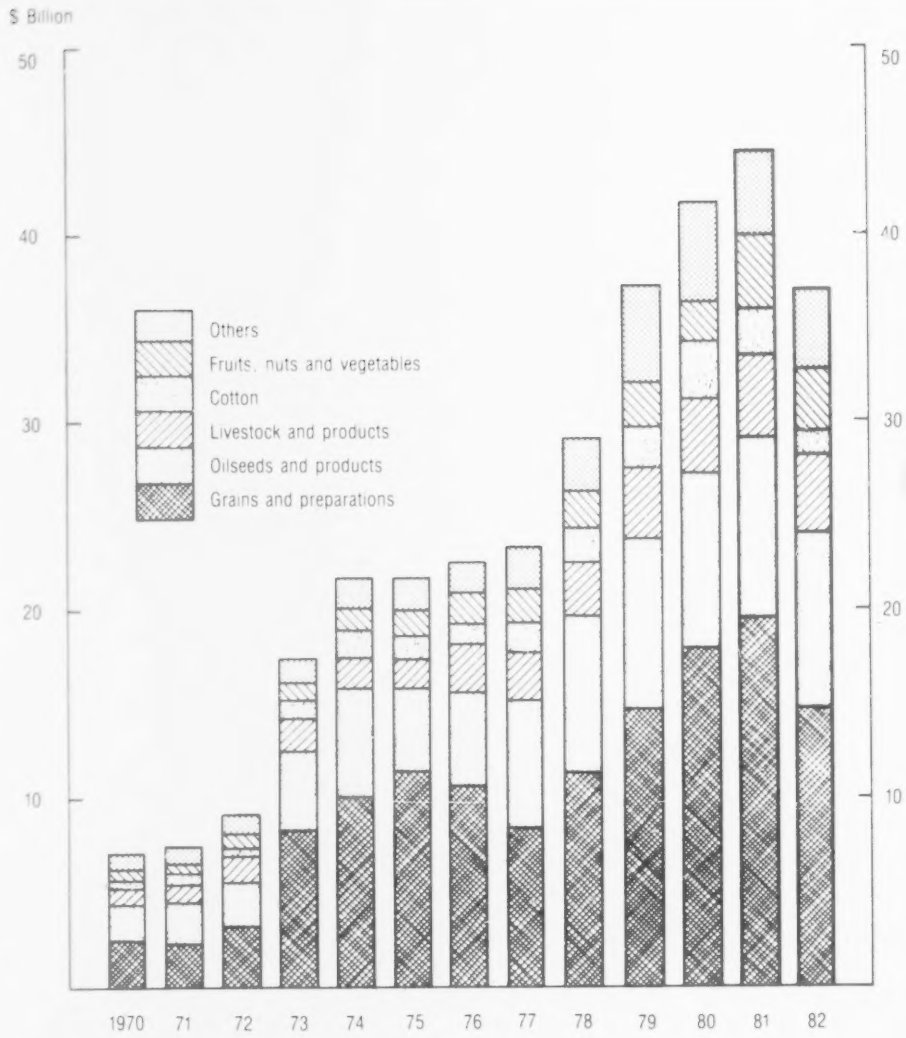


Figure 7. Value of U.S. Agricultural Exports by Commodity, 1970-82 Calendar Years.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1983 and various other issues.

Table 42. U.S. Concessional Government Agricultural Exports as Percent of Total Exports By Major Commodities, Fiscal Years 1977 Through 1982.*

Commodity Products	1982	1981	1980	1979	1978	1977
Wheat and Flour	7.4	7.6	9.6	13.0	14.8	17.5
Corn	1.4	2.0	1.9	3.7	3.7	2.5
Soybean Oil	27.7	38.8	22.0	17.3	29.1	22.0
Cotton (exec. Linters)	.4	.4	.4	1.0	.6	1.2
Milk, non-fat dry	27.3	88.4	53.4	83.4	43.2	99.8
Others	1.2	2.0	2.4	2.6	3.6	4.2

*Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1983; and various other issues.

Table 43. Composition of U.S. Agricultural Exports by Type of Commodity, 1976-77, 1980-81, and 1981-82 in Billions of Dollars.*

Commodity Group	October-September Fiscal Years 1976-77	1980-81	1981-82	Percentage of 1981-82 Total Exports
Feed grains	5.39	10.40	6.96	17.8
Oilseeds	4.64	7.64	8.05	20.6
Oilseed meal	0.97	1.67	1.50	3.8
Vegetable oils	0.77	1.10	.99	2.5
Wheat and wheat products	3.05	8.05	7.68	19.6
Rice	0.69	1.54	1.15	2.9
Meat and meat products	0.61	0.99	.98	2.5
Hides and skins	0.80	1.00	1.02	2.6
Dairy products	0.17	0.24	.37	0 9
Poultry and poultry products	0.30	0.77	.58	1.5
Other animals & animal products	0.77	1.11	1.12	2.9
Cotton	1.54	2.23	2.14	5.5
Fruits, vegetables and nuts	2.45	3.56	3.41	8.7
Tobacco	1.08	1.34	1.49	3.8
Others	0.78	.97	1.65	4.2
Total	24.01	43.78	39.09	99.8

*Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November-December 1982 and November 1977.

Table 44 shows the composition of U.S. agricultural imports by commodity groups. Slightly over one-third of all such imports are not produced in commercial quantities in the United States because of climatic limitations. Products in this category include coffee, tea, rubber, cocoa, drugs, bananas, and certain other tropical fruits. These products are called complementary imports, because they do not compete directly with domestic production.

Supplementary imports compete with domestic production. As shown in table 44, about one-third of the supplementary U.S. farm product imports are animals, animal products, and poultry. (Appendix IV shows the origins of U.S. meat imports in 1981-82.) The remaining two-thirds consist largely of sugar, fruits, nuts, vegetables and vegetable products, and alcoholic beverages. Figure 8 shows the trend in U.S. agricultural imports in the past decade by major commodity groups, while meat export and import trends are shown in figures 9 and 10.

Table 44. Value of U.S. Agricultural Imports in 1975-76, 1979-80, and 1980-81 October-September Fiscal Years by Commodity Groups in Billions of Dollars.[a]

Product	1975-76	1980-81	1981-82	Percent Change 1975-76 to 1981-82
Complementary Imports:				
Cocoa and chocolate	0.60	0.95	0.71	+ 18
Coffee	2.39	3.08	2.81	+ 18
Rubber	0.47	0.77	0.57	+ 21
Tea	0.09	0.13	0.13	+ 44
Bananas and plantains	0.26	0.53	0.57	+119
Drugs	0.11	0.14	0.15	+ 36
Others	0.28	0.32	0.32	+ 14
Total complementary imports	4.21	5.92	5.25	+ 25
Supplementary Imports:				
Dairy products	0.26	0.52	0.59	+127
Hides and skins	0.20	0.28	0.21	+ 5
Meat and meat products, excluding poultry	1.44	2.22	2.02	+ 58
Poultry and poultry products, excluding eggs	0.09	0.10	0.07	− 22
Other animal products and animals	0.33	0.61	0.66	+100
Total animals and animal products	2.31	3.73	3.55	+ 54
Fruits, nuts, vegetables and products	0.88	2.32	2.23	+153
Sugar and products	1.35	2.42	1.38	+ 2
Alcoholic beverages	0.43	1.13	1.23	+186
Oilseeds and products	0.54	0.91	0.51	− 6
Grains, grain products and feed	0.23	0.41	0.46	+100
Tobacco	0.28	0.37	0.34	+ 21
Others	0.30	0.01	0.04	− 87
Total supplementary imports	6.31	11.30	10.09	+ 60
Total agricultural imports[b]	10.51	17.22	15.35	+ 46

[a]Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November-December 1982 and November 1977.

[b]Totals may not add due to rounding.

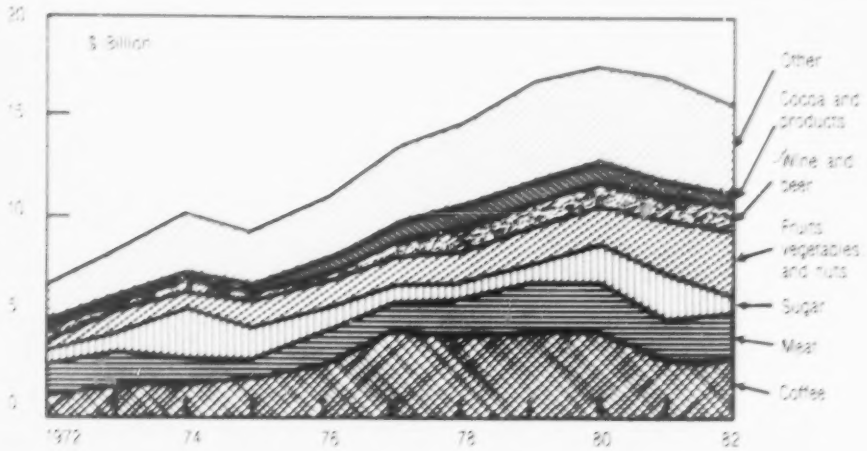


Figure 8. Value of U.S. Agricultural Imports by Commodity, 1972-82 Calendar Years.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1983 and various other issues.

Note: Fruits, vegetables, and nuts include bananas. Other includes dairy products, oilseeds and products, rubber, and other imports.

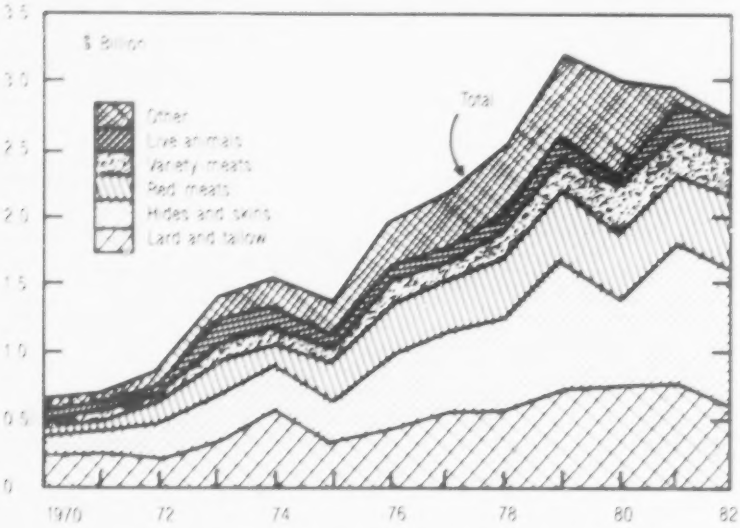


Figure 9. Value of U.S. Livestock Product Exports by Type of Product, 1970-82 Calendar Years.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1983 and various other issues.

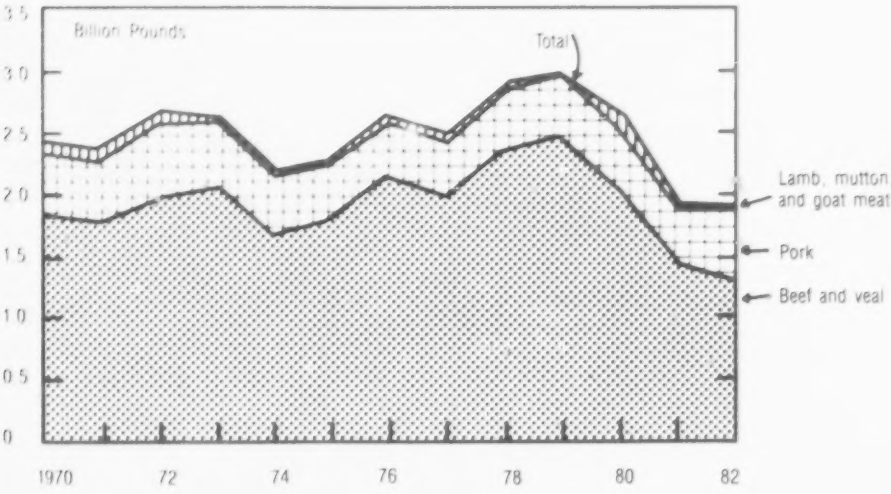


Figure 10. Value of U.S. Red Meat Imports by Type of Product, 1970-82 Calendar Years.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1983 and various other issues.

Value of U.S. Agricultural Exports by Leading States and Economic Groupings of Destinations

As shown in figure 11, the leading states in agricultural exports are Iowa, Illinois, California, and Texas. The first two of these are major exporters of coarse grains, soybeans, and livestock products, while California and Texas export a wider range of products including fruits, vegetables, cotton, and nuts, as well as grain and livestock products.

Figures 13 and 14 show destinations of U.S. wheat and coarse grain exports by economic classification of destinations. Less developed nations represent the largest outlet for U.S. wheat exports by a substantial margin while countries with centrally planned economies are next in importance. In contrast to wheat, coarse grains are used primarily for livestock feed and, thus, are exported mainly to countries with consumer income levels that will permit substantial consumption of red meat and poultry products. For that reason, less developed nations as a group represent only a small market for U.S. feed grain exports.

Trends in U.S. Corn and Coarse Grain Exports by Destinations

As figures 15 and 16 indicate, U.S. corn and coarse grain exports in the first half of the 1982-83 October-September marketing year declined slightly for the third consecutive season. For the entire year, exports are expected to be 20 to 22 percent below the peak level reached in 1980-81. U.S. 1982-83 exports to the Western Hemisphere have recovered moderately as a result of government credit guarantees provided to Mexico for corn purchases. The European Community was the largest overseas market for corn during the 1960s and 1970s but has sharply reduced its purchases of U.S. corn during the past three years. Declining corn imports reflect its large domestic grain supplies along with substantial use of grain substitutes such as cassava or manioc, corn gluten feed and meal from the U.S. alcohol fuels industry, and soybean meal. The European Community does not apply its variable levy system to imports of these products. As a result, they are available to feed manufacturers at more attractive prices than imported corn.

Declining U.S. corn and coarse grain exports also reflect reduced shipments to Eastern Europe, where debt burdens and inability to obtain financing have curtailed imports. Eastern Europe's imports of U.S. coarse grains this season are only a small fraction of their peak levels during the 1979-81 period. Middle East oil-exporting countries remain an almost insignificant importer of U.S. corn, and Soviet purchases have dropped to only slightly above minimum levels called for in the U.S.-USSR Grain Agreement. Reduced Soviet purchases reflect that country's increased production, lower total grain imports than two years ago, and efforts to diversify its sources of supply. U.S. exports to Japan, Korea, People's Republic of China, and the "others" category have expanded moderately, partially offsetting weak demand in other foreign markets.

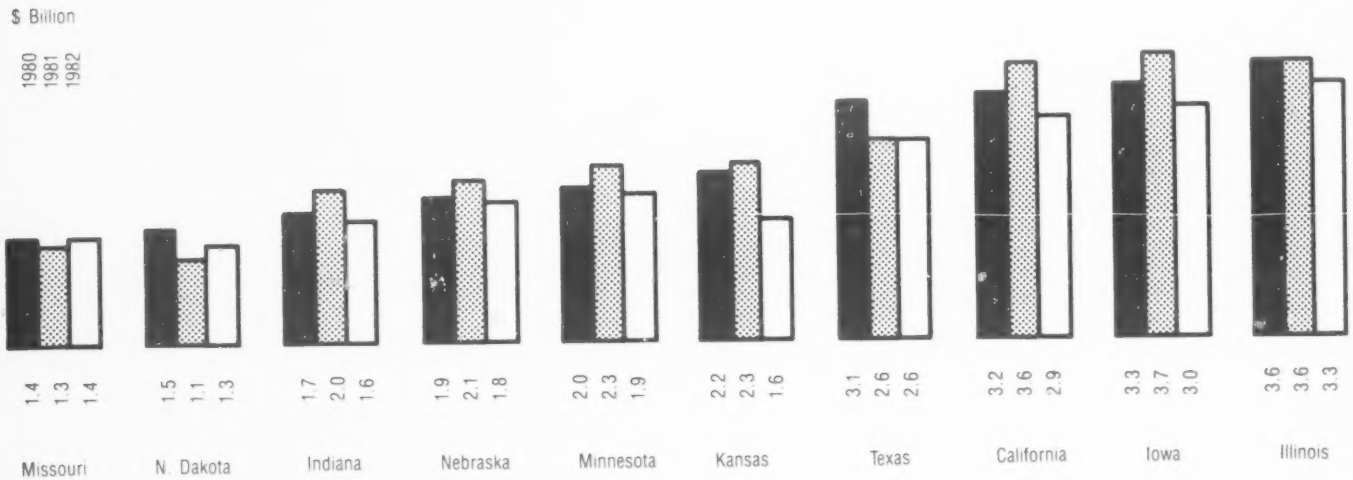
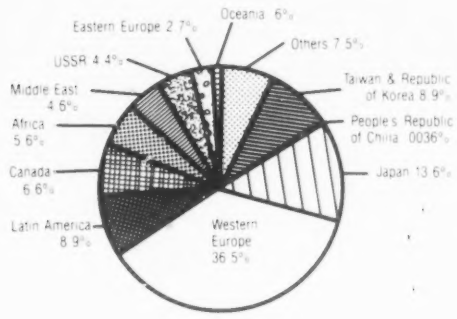
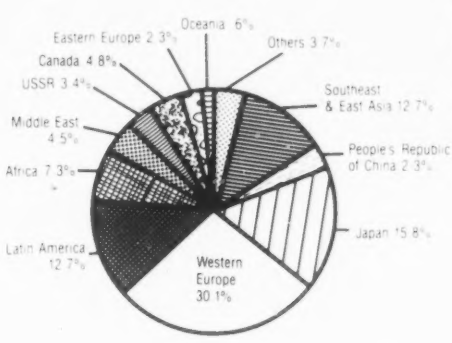


Figure 11. Value of U.S. Agricultural Exports by Leading States, 1980-82.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), March-April 1983 and various other issues.



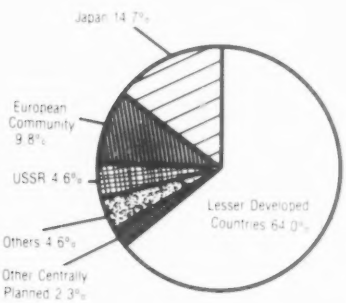
Fiscal Year 1976-77



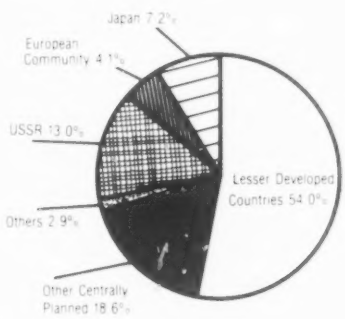
Fiscal Year 1982-1983

Figure 12. Value of U.S. Agricultural Exports by Destinations, 1976-77 and Projected 1982-83.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), March-April 1983 and various other issues.



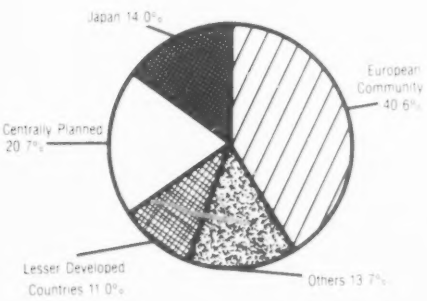
Fiscal Year 1971-72



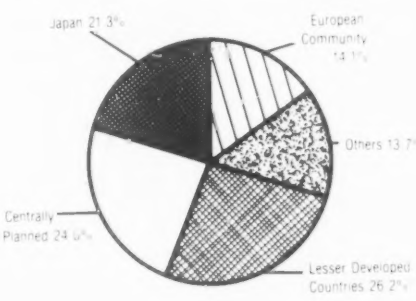
Fiscal Year 1981-82

Figure 13. U.S. Wheat Export Percentage Shares to Selected Destinations, October-September 1971-72 and 1981-82.

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 29-82 (Washington, D.C.), September 15, 1982 and FG 23-77 (Washington, D.C.), November 11, 1977.



Fiscal Year 1971-72



Fiscal Year 1981-82

Figure 14. U.S. Corn Export Percentage Shares to Selected Destinations, October-September 1971-72 and 1981-82.

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular, Grains*, FG 29-82 (Washington, D.C.), September 15, 1982 and FG 23-77 (Washington, D.C.), November 11, 1977.

In the years immediately ahead, U.S. corn and coarse grain exports appear likely to increase modestly, but at a much slower rate than the dramatic increases of the 1970s. During the first half of 1983-84, U.S. exports will face less than normal competition from South Africa and Argentina, where spring 1983 corn harvests were reduced by drought. Weather problems were most severe in South Africa, with that country temporarily importing corn in contrast to its usual position as an exporter. Low supplies in South Africa will tend to increase U.S. corn exports until April 1984. Yet, with a more normal December-April growing season, South Africa would again become a competitor of U.S. corn exports from May or June 1984 onward.

Export growth in the 1980s may continue to be restrained by a strong U.S. dollar, as well as by an adjustment period in which Eastern Europe, Mexico, and certain other nations lengthen the repayment period on outstanding debts and limit imports to reduce debt burdens.

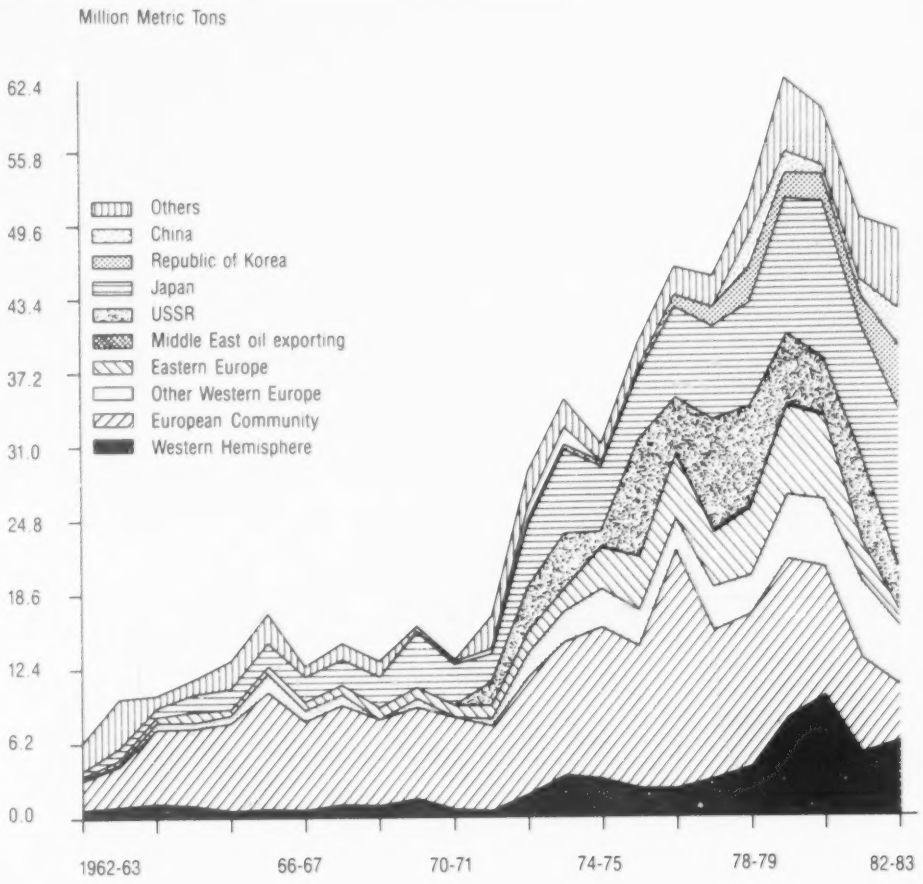


Figure 15. U.S. Corn Exports by Destination, October-September, 1960-61 to 1982-83.

Note: 1982-83 exports are projected using the October 1982-March 1983 percentage change from a year earlier

Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Missouri), various issues and *Grain Market News* (Independence, Missouri), various issues.

Trends in U.S. Soybean and Soybean Product Exports by Destinations

Figures 17 to 19 indicate U.S. soybean complex exports during the first half of the 1982-83 marketing year have been substantially stronger than those for corn and coarse grains. Soybean exports were approximately the same as the previous season's record level and substantially above the recent low point in 1980-81. U.S. bean exports to Mexico, Western European countries outside the European Community, Japan, and Taiwan have increased substantially from the previous marketing year.

U.S. soybean exports appear to have been strengthened relative to corn by (1) a drought-reduced soybean harvest in Brazil during the spring of 1982, (2) increased protein imports by the Soviet Union, which absorbed competing non-U.S. supplies, and (3) soybean complex prices which have been lower than normal compared to corn and have encouraged substituting soybean meal for feed grains.

U.S. soybean meal exports continued to trend upward through early 1983, with much of the growth occurring in the European Community. As figure 18 indicates, the European Community continues to be the dominant export destination for U.S. soybean meal, although increased Mexican imports are making the Western Hemisphere an increasingly significant market for this product. As with coarse grains, the Eastern European market for soybean meal has fallen sharply in the past two years.

U.S. soybean oil exports increased more sharply than either soybeans or soybean meal during the first half of the 1982-83 marketing year. Much of this season's increase reflects expanded shipments to the Western Hemisphere and Europe. Pakistan also continues to be a major outlet for U.S. soybean oil this season. Increased 1982-83 exports reflect (1) reduced availability of soybean oil from Brazil's spring 1982 soybean crop, (2) relatively low soybean oil prices, and (3) U.S. government financing activity including the Blended Credit Program and CCC credit guarantees.

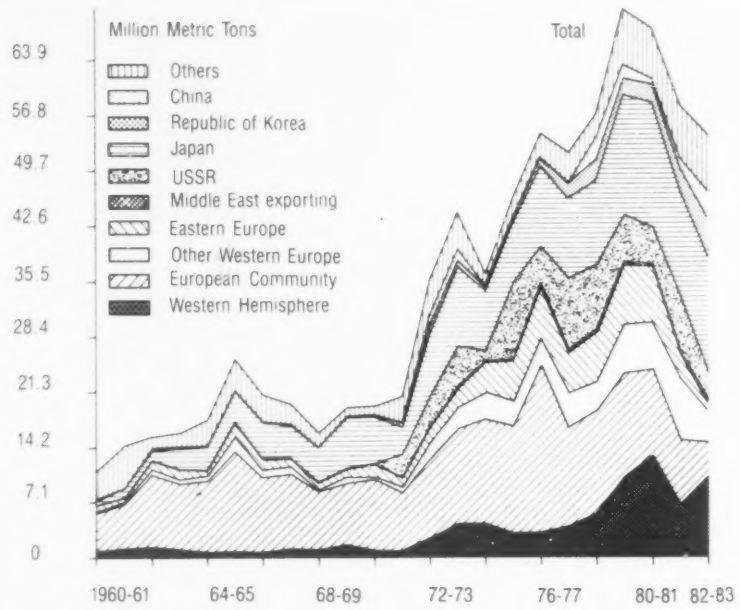


Figure 16. U.S. Coarse Grain Exports by Destination, October-September, 1960-61 to 1982-83.

Note: 1982-83 exports are projected using the October 1982-March 1983 percentage change from a year earlier.

Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Missouri), various issues and *Grain Market News* (Independence, Missouri), various issues.

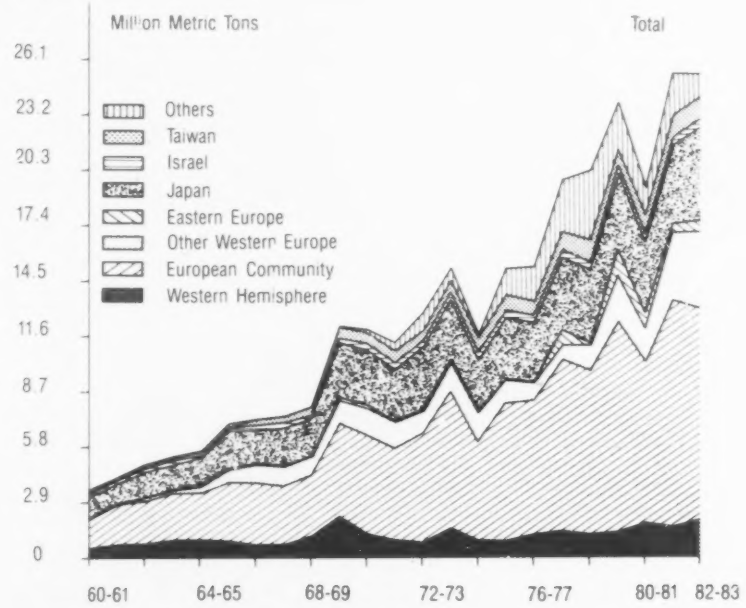


Figure 17. U.S. Soybean Exports by Destination, October-September, 1960-61 to 1982-83.

Note: 1982-83 exports are projected using the October 1982-March 1983 percentage change from a year earlier.

Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Missouri), various issues and *Grain Market News* (Independence, Missouri), various issues.

Export trends during 1983-84 will be influenced by the availability of soybeans and soybean products from South America's spring 1983 harvest. Production is estimated to be modestly above last year's drought-reduced level. Production estimates remained tentative at mid-year because of heavy rains, which delayed harvest of the final one-third to one-fourth of the crop into early June. If field losses were not extreme, increased Brazilian supplies could temper U.S. soybean exports until at least March 1984. For the longer term, U.S. soybean and soybean product exports appear likely to trend modestly upward but at a substantially slower pace than in the 1970s. Expanded protein feeding in the Soviet Union should help maintain an upward trend in U.S. exports as that nation absorbs increasing quantities of foreign and/or U.S. beans and meal. However, growth rates are expected to be restrained by foreign debt burdens and a relatively firm U.S. dollar. Soybean oil exports will likely show large year-to-year fluctuations depending on production of such competing products as palm oil, coconut oil, butter, lard, rapeseed oil, sunflower seed oil, and cottonseed oil.

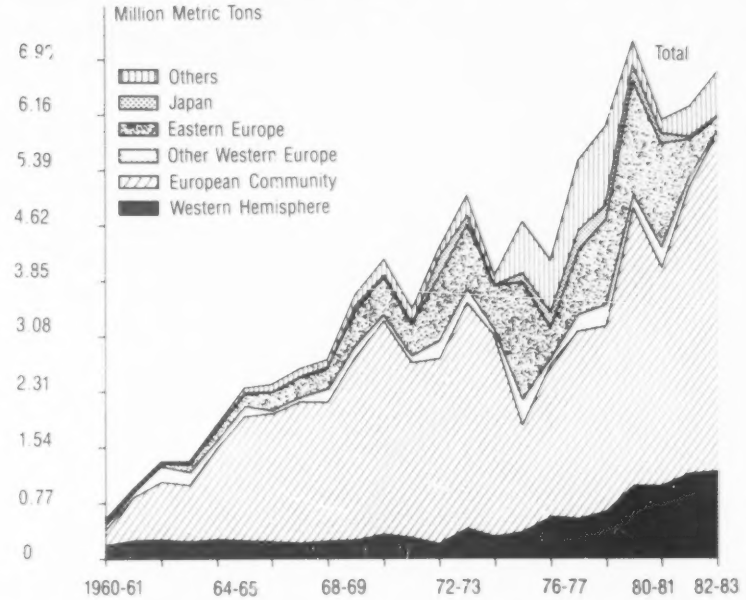


Figure 18. U.S. Soybean Meal Exports by Destination, October-September, 1960-61 to 1982-83.
Note: 1982-83 exports are projected using the October 1982-March 1983 percentage change from a year earlier.
Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Missouri), various issues and *Grain Market News* (Independence, Missouri), various issues.

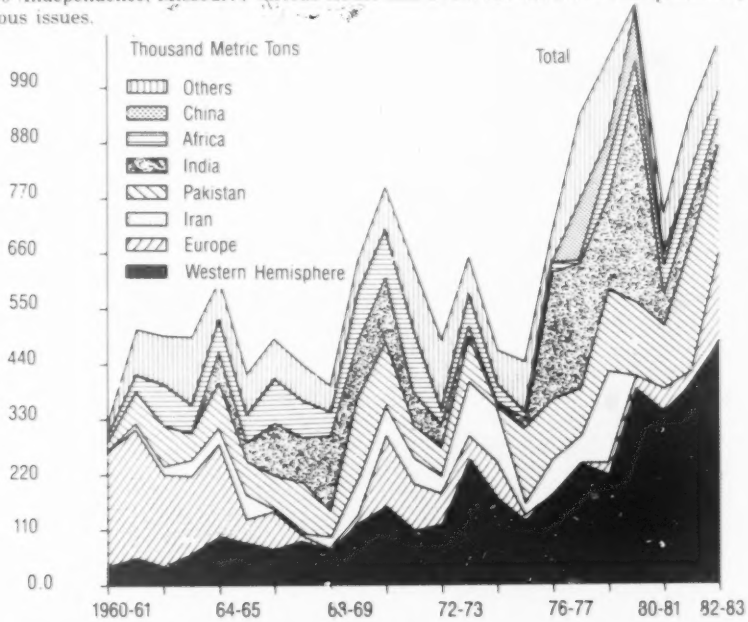


Figure 19. U.S. Soybean Oil Exports by Destination, October-September, 1960-61 to 1982-83.
Note: 1982-83 exports are projected using the October 1982-March 1983 percentage change from a year earlier.
Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseed and Products*, (Washington, D.C.), various issues.

Trends in U.S. Wheat Exports by Destinations

During 1982-83, U.S. wheat exports dropped sharply from the previous season's record level. Sales to the Western Hemisphere, Europe, Soviet Union, and China all have dropped sharply below a year earlier. The only major exception to this trend was India, which increased its imports of U.S. wheat to offset a disappointing 1982 crop. As with other major farm products, declining U.S. wheat exports are caused partly by a strong U.S. dollar and world economic problems. However, U.S. exports also have been limited by large 1982-83 production in Western Europe, Canada, and Argentina. In the absence of government production control and reserve stock programs, these countries have aggressively moved surplus supplies into world markets to avoid sharp increases in carryover stocks. Tools helping expand their exports included export subsidies, credit arrangements for foreign buyers, and price-cutting below world market levels. World competition would have been even more severe this season, if Australia's 1982-83 wheat crop had not suffered one of its most severe droughts in recent memory.

U.S. wheat exports may recover some in the next few years from the depressed 1982-83 level. However, sizable yearly fluctuations in foreign demand are likely to continue because of weather variations in such key producing areas as the Soviet Union, India, Australia, Argentina, and Canada. All of these nations have somewhat unstable climates. Without widespread adverse weather, growth of U.S. wheat exports in the next few years may continue to be restrained by the strong U.S. dollar, debt problems abroad, and competing supplies from other exporters. The European Community plans to feed an additional 2 to 3 million metric tons (74 to 110 million bushels) of its wheat to livestock during the year ahead.[26] Such a move will likely lower European Community imports of coarse grains, but will slightly moderate competition in world wheat trade. The moderating effect may well be partially or fully offset by a return to more normal weather in Australia and increased wheat plantings there and in Canada.

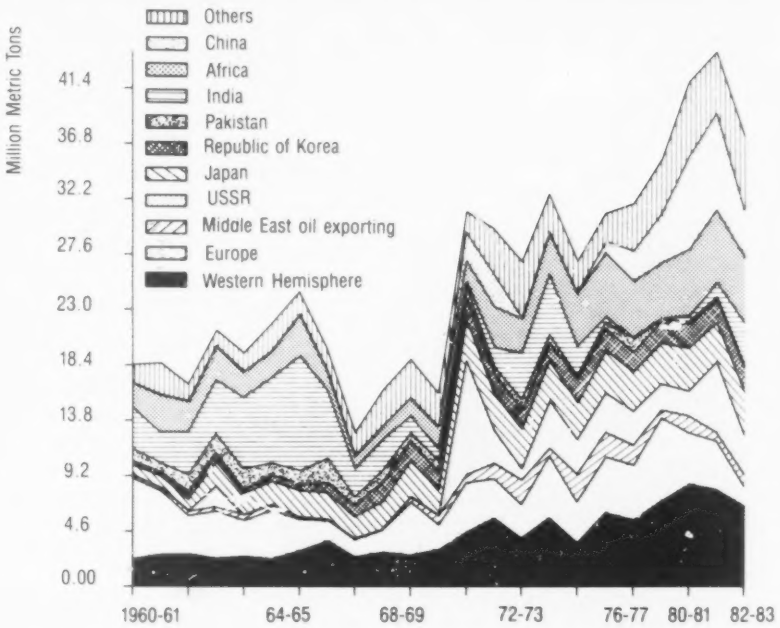


Figure 20. U.S. Wheat Exports by Destination, October-September Fiscal Years, 1960-61 to 1982-83.

Note: 1982-83 exports are projected using the October 1982-March 1983 percentage change from a year earlier.

Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Missouri), various issues and *Grain Market News* (Independence, Missouri), various issues.

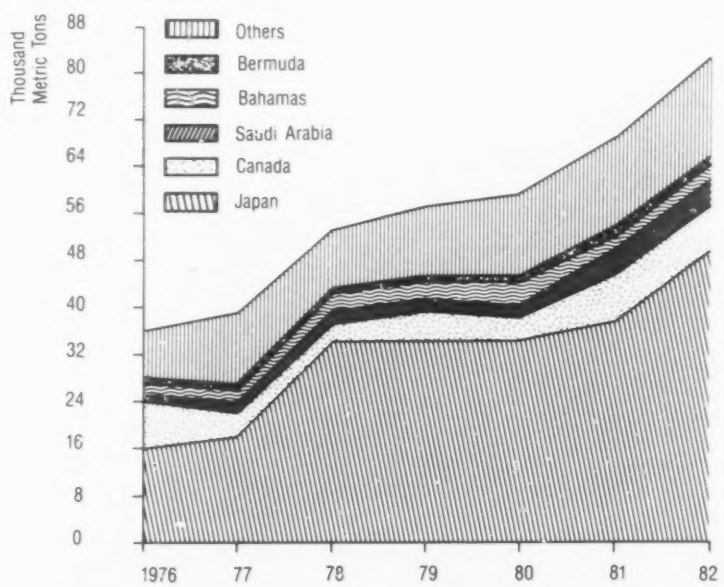


Figure 21. U.S. Beef Exports by Major Destinations, 1975-76 through 1981-82 October-September Fiscal Years.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agriculture Trade of the United States* (Washington, D.C.), November-December 1982 and various other issues.

Trends in U.S. Red Meat Exports

Japan and Canada continue to be the largest single foreign destinations for U.S. beef and pork, and are significant importers of edible offals and variety meats. In 1981-82, Japanese imports of U.S. beef increased sharply (see figure 21). Factors behind the increase included a modest expansion in the Japanese economy and easing of import restrictions in response to U.S. pressures. U.S. beef exports to Canada also rose slightly last year. U.S. pork exports to Latin America and the "others" category in figure 22 remained relatively constant in 1981-82. However, exports to Japan and Canada declined substantially, thus causing a moderate reduction in total U.S. pork exports. As shown in figure 23, U.S. exports of edible offals and variety meats to United Kingdom, Belgium-Luxembourg, Canada, and Egypt rose moderately in 1981-82. Exports to most other foreign destinations were relatively stable during the year.

U.S. exports of meat and meat products during the rest of this decade will continue to depend heavily on foreign trade policies of the European Community and Japan. With relatively strong domestic political influence, livestock producers in these nations have discouraged sharply expanded U.S. imports which would depress their prices. While some growth in U.S. meat exports appears likely in the next few years, the growth rate likely will be limited by continued pressure from foreign producers.

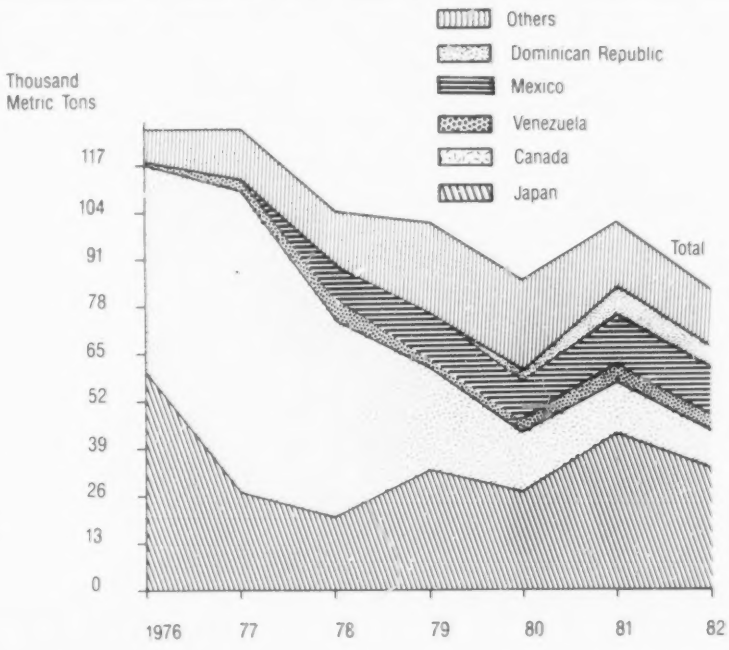


Figure 22. U.S. Pork Exports by Major Destinations, 1975-76 through 1981-82 October-September Fiscal Years.
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agriculture Trade of the United States* (Washington, D.C.), November-December 1982 and various other issues.

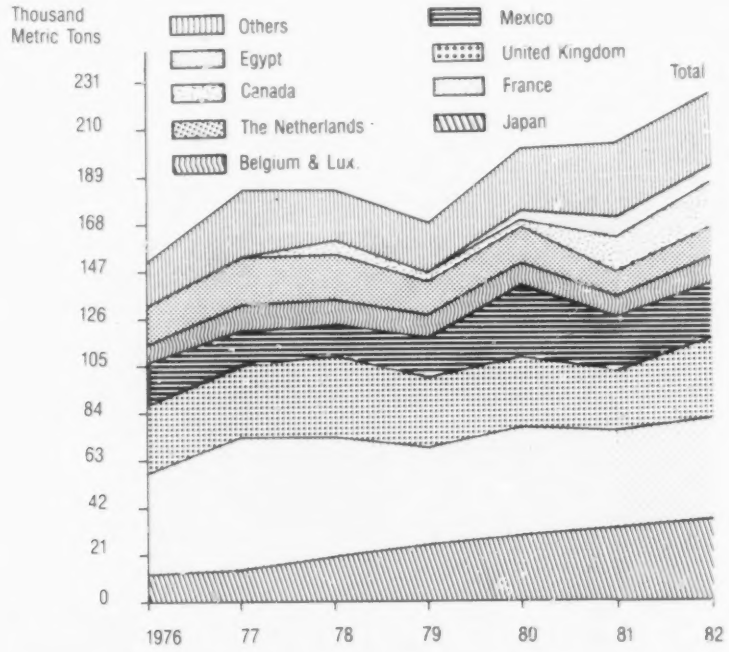


Figure 23. U.S. Exports of Edible Offals and Variety Meats by Major Destinations, 1975-76 through 1981-82 October-September Fiscal Years.
Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agriculture Trade of the United States* (Washington, D.C.), November-December 1982 and various other issues.

Policy Issues in World Food Trade

Global food and agricultural policies will impact heavily on American farmers and the developing world's food supply the rest of this decade. In fact, trade-related policies appear to be more important to U.S. agriculture now than at any time in the past two decades. Important trade issues include monetary and fiscal policy and exchange rates, embargoes, export subsidies, import restrictions, supply management, agricultural development, bilateral trade agreements, global food security, and alternatives for financing imports of developing nations. Our earlier analysis indicates the current weakness in U.S. and world food exports is strongly related to monetary conditions. Attention to this area is likely to be most effective in improving the longer term performance of American farm product exports.

Monetary and Fiscal Policies

U.S. agricultural exports currently are being restrained by debt burdens of several developing and middle income nations. Numerous factors contributed to the build-up of excessive debts including (1) unrealistic expectations about future demand growth and inflation rates in developed nations, (2) substantial growth of the U.S. money supply in the 1970s and a plentiful supply of funds available for loans to developing nations, and (3) recent changes in U.S. and foreign monetary and fiscal policies that have generated high interest rates, a slowdown of economic growth in industrial nations, and a strong U.S. dollar. With widespread use of variable-interest loans, high real interest rates have made developing nations' debts more burdensome than originally anticipated. In addition, developed nations are the major market outlet for products of the developing world. A slowdown in economic growth of major industrial nations has contributed to the debt burdens of potential foreign customers for U.S. farm products by slowing the growth in demand for their economic output. While the debt problem is not unsurmountable, no easy solutions are available. There are serious pitfalls if policy makers attempt to correct the problem too rapidly.

Policy variables available for dealing with world debts include: (1) restructuring debts of developing nations to extend repayment periods, (2) reducing the U.S. federal budget deficit in order to lower goverment credit requirements, increase funds available for private lending, and thus reduce interest rates, and (3) encouraging balanced growth of the money supply in industrial nations to avoid excessive inflation. U.S. monetary and fiscal policies are a dominant influence on world currency markets. U.S. monetary restraint and high U.S. real interest rates, for example, tend to draw funds into the United States for investment purposes, thus strengthening the American dollar. Low U.S. real interest rates tend to have the opposite effect (real interest rates are the nominal rate minus the rate of inflation). In the 1970s when the U.S. dollar was declining in value against major foreign currencies, U.S. real interest rates often were negative. Because American farm product exports are sensitive to exchange rate variations, high real U.S. interest rates restrict the nation's agricultural exports.

Some groups suggest the debt and exchange rate problems can be solved by substantial expansion of the U.S. money supply, thus driving real U.S. interest rates down. In the short run, such action might lower the value of the dollar, stimulate U.S. agricultural exports, reduce interest costs of foreign nations, and allow them to repay debts with lower-valued dollars. Yet, such action would likely generate renewed expectations of high inflation and could bring an even greater build-up of debt burdens in future years. On the other hand, extremely limited growth of the U.S. money supply combined with current large borrowings by the U.S. government might well bring a different danger: default on loans by some foreign borrowers because of high interest costs and sluggish demand for products they export to meet debt-servicing requirements. Widespread defaults could place severe stresses on the world monetary system and would make private lenders unwilling to extend new credit to developing nations.

To safely resolve current debt problems, moderation and patience will be required. It appears likely that the next few years will be a period of global adjustment and consolidation of debts, with world food trade growing more slowly than in the 1970s. World economic growth also appears likely to be less robust than in the last decade but should accelerate in the late 1980s as debt pressures diminish. Future growth rates will depend heavily on policy actions taken during the next two years.

Embargoes

The United States has not been the only nation to halt exports of farm products in recent years. Exporters such as Brazil, Argentina, Canada, Australia, and Thailand often halt sales of agricultural commodities because of limited supplies. Exportable supplies from these nations individually are much smaller than those of the United States and such embargoes generally have little market impact. However, the United States is by far the largest exporter of wheat, coarse grains, and soybeans and a U.S. embargo has a much larger impact on world trade patterns. Embargoes distort market signals to U.S. and foreign producers. In some cases, U.S. trade restrictions also may encourage increased domestic production by importing nations. Also, without strong cooperation from other exporting countries, embargoes have been ineffective in restricting total imports of an individual country. For these reasons, trade embargoes are economically undesirable.

Recent legislation provides U.S. agriculture with substantial protection against trade embargoes, except in cases of national emergencies where exports of both farm and nonfarm products are restricted.[27] This legislation is likely to reduce but not completely eliminate the possibility of U.S. export embargoes in the years ahead.

Trade Subsidies

Trade subsidies have been used periodically as a means of reducing a nation's domestic surpluses and or increasing its share of global trade. With declining world grain exports in 1982-83, surplus supplies in the European Community and the United States have generated increased pressure for use of such subsidies. Trade subsidies can be expected to accomplish their objectives only if (1) they are targeted to countries otherwise lacking purchasing power and or (2) they cause competing countries to reduce production or increase carryover stocks. If these conditions are not met, trade subsidies run a risk of creating a trade war with increasing costs to taxpayers, as each side matches the other's increasingly larger subsidies in an attempt to obtain a larger share of the market. In the current U.S.-European Community subsidy situation, the United States has obtained substantial 1982-83 flour sales to Egypt at the European Community's expense, but lost wheat sales to the European Community in China. It also appears that large export subsidy costs will cause the European Community to increase domestic wheat feeding in 1983-84. That almost certainly will reduce U.S. corn exports below levels that would otherwise exist. Thus, any increase in the U.S. share of world wheat trade as a result of export subsidies may be partially offset by losses in corn exports.

Trade subsidy impacts on production of developing nations also should be considered when such policies are implemented. Heavily subsidized exports to developing countries can decrease incentives to expand production in recipient nations. Thus, in the longer run, large-scale use of such subsidies could have disadvantages for some developing countries. With these potential negative aspects, it seems advisable to use trade subsidies with substantial caution. They should not be expected to solve current weakness in export demand that stems from world economic problems.

Bilateral Trade Agreements

In 1976, the United States entered into its first five-year grain trade agreement with the Soviet Union.[27] Unlike many major grain importers, grain purchases in the Soviet Union are made by a single government purchasing agency that is capable of covering import needs for a year or more in the future in a matter of days. With the Soviet Union often being one of the world's largest importers of grain and with large yearly variations in import needs, potential disruptions in grain markets were ever-present. To reduce uncertainty about Soviet purchases, the U.S.-Soviet grain agreement provided for specific minimum and maximum quantities to be sold annually by the United States to the Soviet Union. Other provisions allowed "maximum" sales levels to be exceeded through government-to-government consultations. Since the mid-1970s, other grain-exporting nations have greatly expanded their use of long-term agreements with grain importers. The United States also has negotiated similar agreements with Mexico and the People's Republic of China.

Bilateral agreements are intended to provide importing nations with an assured quantity of grain regardless of world market conditions. In that sense, they tend to bypass the normal market functions of discouraging utilization when world supplies are limited and encouraging utilization when supplies are large. As an increasing share of global grain trade is brought under such agreements, one can expect more severe adjustment burdens in countries that rely on relatively free market conditions to balance changing supplies with demand.[28] A similar impact stems from the European Community variable levy and high internal price support system for wheat and coarse grains. The system to a large extent insulates European Community grain users from variations in world supplies. These and other policies, which reduce needed utilization adjustments by large grain users, tend to magnify the adjustment burden faced by the United States and certain developing nations. From a policy standpoint, it is questionable whether widespread global use of trade agreements is desirable for American agriculture. However, a case might be made that such agreemets are appropriate with the Soviet Union because of its centralized government purchasing agency and a resulting potential for large unexpected fluctuations in its imports.

Food Security

Despite recent burdensome grain carryover stocks in the United States, food security remains an important and complex policy issue for much of the developing world. Some world food authorities place minimum required global grain carryover stocks—from a food security position—at 17 to 18 percent of

annual utilization.[10] That is approximately equal to expected ending 1982-83 world carryover stocks. The geographic distribution of inventories is important for the food security of developing nations, and also affects prices paid to producers in the United States and other exporting nations.[11]

Unresolved issues in world food security include (1) the desired size of reserve stocks both globally and in individual countries, (2) methods of sharing storage costs, (3) procedures for timing the acquisition and release of reserve stocks, and (4) impacts of reserve stocks on producers in both importing and exporting nations. With the differing viewpoints of producers, consumers, exporters, and importers of food, the prospects for a large-scale unified world food reserve system remain nearly as clouded as in 1974, when the 36 members of the United Nations' World Food Council voted to work toward a world without hunger within a decade. While current U.S. surpluses appear to diminish the urgency of the food security question, it remains an important policy issue for the people of Africa, the Indian sub-continent, and parts of Latin America.[12]

Gilmore and Huddleston note that in 1982-83 with the build-up of global grain stocks, world policy makers face an unusual dilemma. Production controls and reduced stocks in exporting nations work against food security of developing countries. Yet, if production is not controlled, developed nations may be forced to dump their surpluses on world markets in ways that will discourage long-run production goals of developing country importers.[13] With the complexity of the food security problem, a combination of approaches may be needed for its solution including (1) reserve stocks, (2) food aid commitments, (3) stand-by financing for emergency food purchases, and (4) increased emphasis on agricultural development in certain key geographic problem areas.

Trade Protectionism

The sluggish world economy, high unemployment levels, and declining world trade have generated increasing global pressures for protection against import competition. That is true in the European Community where rising expenditures for the Common Agricultural Policy (CAP) are approaching a crisis situation.[14] In the European Community some sectors are pressing for restrictions on imports of corn gluten feed and meal as well as soybean products to encourage increased use of domestic European Community grains. In the United States, recent protectionist pressures prompted restrictions on textile imports and discussions of further restrictions on imports of foreign autos and steel.[15]

In responding to these pressures, policy makers should note the experience with protectionism during the early 1930s. In 1930, similar world economic conditions led the United States to implement the Hawley-Smoot Tariff. This act imposed high tariffs on U.S. imports and was one of several factors contributing to a substantial decline in global trade and economic activity.[16] Import restrictions tend to discourage trade by restricting the ability of foreign nations to earn foreign exchange for buying other countries' products.

Other Policy Areas

Other policy areas of current concern include procedures for balancing global grain production and utilization, strategies for encouraging agricultural development in developing nations, and methods of financing imports in the developing world. At this writing, it appears that most of the production adjustment to match declining world trade will be done by the United States. From a U.S. viewpoint, it would be desirable to have the adjustment burden shared by other exporting nations. But so far, no mechanism has been developed for accomplishing that objective. The future of food production and trade in the developing world will depend heavily on its access to financing, not only for imports but also for economic development. Developed nations and world monetary authorities face a major challenge in the years just ahead in finding creative ways to finance these needs.

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Notes

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[2]Ibid.

[3]For an historical view of the evolution of the world monetary system and detailed changes in the early 1970s, see Victor Argy, *The Postwar International Money Crises: An Analysis* (London: George Allen & Unwin, 1981).

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[21]Ibid.

[22]U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1983 and January-February 1981.

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[26]U.S. Department of Agriculture, Foreign Agricultural Service, *Weekly Roundup of World Production and Trade* WR 21-83 (Washington, D.C.), May 15, 1983.

[27]97th Congress, *Agriculture and Food Act of 1981, Conference Report*, U.S. Senate Report No. 97-290 (Washington, D.C.), November 30, 1981, Section1204-1205, pp. 66-69, provides for sharp increases in government price support levels under certain conditions when an embargo is implemented only on agricultural commodities. January 1983 legislation included in the Commodity Futures Trading Commission Reauthorization Act requires the U.S. Government to permit shipment of agricultural products under previously existing export sales contracts for 270 days after a declared embargo (Based on U.S. Wheat Associates, *Newsletter* (Washington, D.C.), January 14, 1983, p. 1).

[28]U.S. International Trade Commission, *Operation of Trade Agreements Program, 28th Report* (Washington, D.C.), 1977, p. 26.

[29]For a discussion of the extent to which instabilities in Soviet grain production are passed on to Western consumers and producers, see Joseph C. Brada, "International Policy Decisions, and Food Import Demand in Centrally Planned Countries" in U.S. Department of Agriculture, Economic Research Service, *Consortium on Trade Research, Agricultural Import Demand in Low Income, Middle Income, and Centrally Planned Countries*, Foreign Agricultural Economic Report No. 173 (Washington, D.C.), August 1982.

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[31]For policy issues related to world food security, see David Bigman, *Coping With Hunger: Toward a System of Food Security and Price Stabilization* (Ballinger Publishing Co., Cambridge, Massachusetts), 1982; and U.S. Department of Agriculture, Economic Research Service, *Problems and Prospects in Sub-Saharan Africa*, Foreign Agricultural Economic Report No. 166 (Washington, D.C.), 1981.

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[33]Richard Gilmore and Barbara Huddleston, "The Food Security Challenge," *Food Policy*, Vol. 8, No. 1, February 1983, pp. 31-45.

[34]Timothy E. Josling and Scott R. Pearson, *Developments in the Common Agricultural Policy of the European Community*, U.S. Department of Agriculture, Economic Research Service, Foreign Agricultural Report No. 172 (Washington, D.C.), June 1982.

[35]For discussions of grain trade restrictions by various other countries, see Cathy L. Jabara, "National Grain Policies, the International Dimension" in *Food Policy* Vol. 7, No. 1, February 1982, pp. 39-45.

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Appendix I. Food Production and Population Trends by Economic and Geographic Classifications of Countries

Classification of Countries by Economic Category

Developed Market Economics

1. Australia
2. Austria
3. Canada
4. Denmark
5. Finland
6. West Germany
7. France
8. Iceland
9. Ireland
10. Italy
11. Japan
12. Luxembourg and Belgium
13. The Netherlands
14. Norway
15. Sweden
16. Switzerland
17. United Kingdom
18. United States

Centrally Planned Economies

1. Albania
2. Angola
3. Bhutan
4. Bulgaria
5. China
6. Cuba
7. Czechoslovakia
8. East Germany
9. Hungary
10. Kampuchea (Cambodia)
11. Korea (North)
12. Laos
13. Mongolia
14. Mozambique
15. Poland
16. Romania
17. South Yemen
18. USSR
19. Vietnam
20. Yugoslavia

Other Developing Nations

1. Afghanistan
2. Bahamas
3. Bahrain
4. Bangladesh
5. Barbados
6. Benin
7. Botswana
8. Burma
9. Burundi
10. Central African Republic
11. Chad
12. Comoros
13. Cape Verde
14. Djibouti
15. Dominica
16. Ethiopia
17. Equatorial Guinea
18. Fiji
19. Gabon
20. The Gambia
21. Grenada
22. Guinea
23. Guinea Bissau
24. Guyana
25. Haiti
26. Kenya
27. Lesotho
28. Madagascar
29. Malawi
30. Maldives
31. Mali
32. Malta
33. Mauritania
34. Mauritius
35. Nepal
36. Niger
37. Oman
38. Qatar
39. Rwanda
40. St. Lucia
41. Sao Tome Principe
42. Seycheiles
43. Sierra Leone
44. Solomon
45. Somalia
46. Sri Lanka
47. Sudan
48. Surinam
49. Swaziland
50. Tanzania
51. Togo
52. Uganda
53. United Arab Emirates
54. Upper Volta
55. Western Samoa
56. Zaire

Rapidly and Moderately Developing Nations

1. Algeria
2. Argentina
3. Bolivia
4. Brazil
5. Cameroon
6. Chile
7. Colombia
8. Congo
9. Costa Rica
10. Cyprus
11. Dominican Republic
12. Ecuador
13. Egypt
14. El Salvador
15. Ghana
16. Greece
17. Guatemala
18. Honduras
19. India
20. Indonesia
21. Iran
22. Iraq
23. Israel
24. Ivory Coast
25. Jamaica
26. Jordan
27. Korea (South)
28. Kuwait
29. Lebanon
30. Liberia
31. Libya
32. Malaysia
33. Mexico
34. Morocco
35. New Zealand
36. Nicaragua
37. Nigeria
38. Pakistan
39. Panama
40. Papua New Guinea
41. Paraguay
42. Peru
43. Philippines
44. Portugal
45. Puerto Rico
46. Saudi Arabia
47. Senegal
48. Singapore
49. South Africa
50. Spain
51. Syria
52. Taiwan
53. Thailand
54. Trinidad
55. Tunisia
56. Turkey
57. Uruguay
58. Venezuela
59. North Yemen
60. Zambia
61. Zimbabwe

Classification of Countries by Geographic Location

North Africa
Algeria
Chad
Egypt
Ethiopia
Libya
Mali
Mauritania
Morocco
Niger
Sudan
Tunisia

Southern Africa
Namibia (Southwest)
South Africa
Zimbabwe

Sub-Saharan Africa
Angola
Benin
Botswana
Burandi
Cameroon
Cape Verde
Central African Republic
Comoros
Congo
Djibouti
Gabon
Gambia
Ghana
Guinea
Guinea Bissau
Ivory Coast
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mauritius
Mozambique
Nigeria
Reunion
Rwanda
Senegal
Sierra Leone
Somalia
Swaziland
Uganda
Upper Volta
Tanzania
Zaire
Zambia
Zanzibar

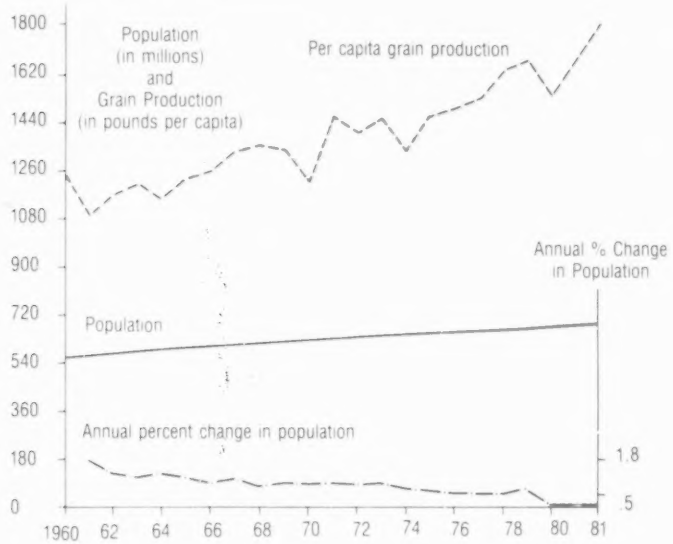
Indian Subcontinent
Afghanistan
Bangladesh
Burma
India
Nepal
Pakistan
Sri Lanka
Thailand

Central America
Antigua
Bahamas
Barbados
Bermuda
British Honduras
Costa Rica
Cuba
Dominican Republic
El Salvador
Grenada
Guatemala
Guadeloupe
Haiti
Honduras
Jamaica
Martinique
Montserrat
Netherlands Antilles
Nicaragua
Panama
Puerto Rico
Trinidad and Tobago
United States Virgin Islands

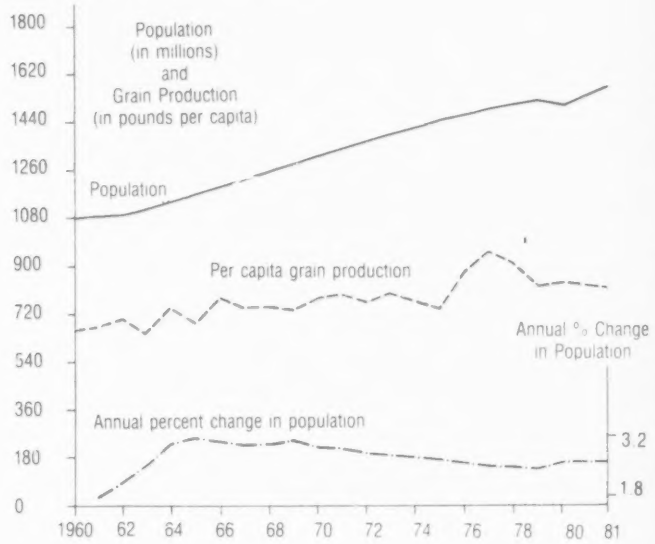
South America
Argentina
Bolivia
Brazil
Chile
Columbia
Ecuador
French Guiana
Guyana
Paraguay
Peru
Surinam
Uruguay
Venezuela

Others
Mexico

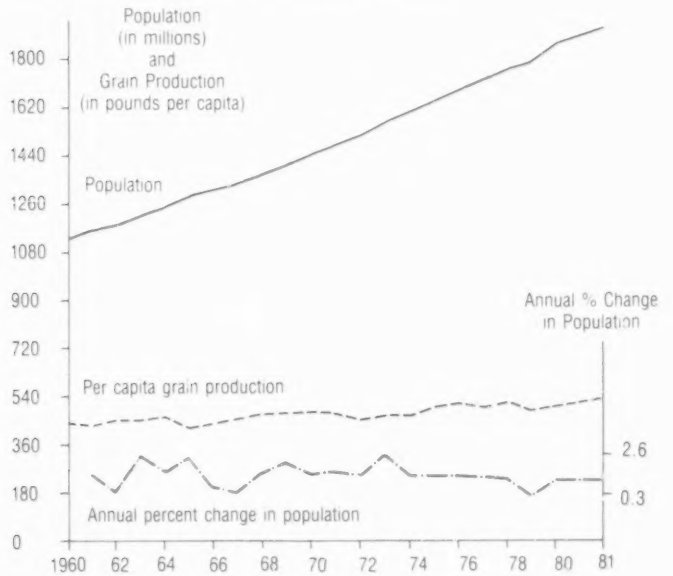
Developed Market Economies



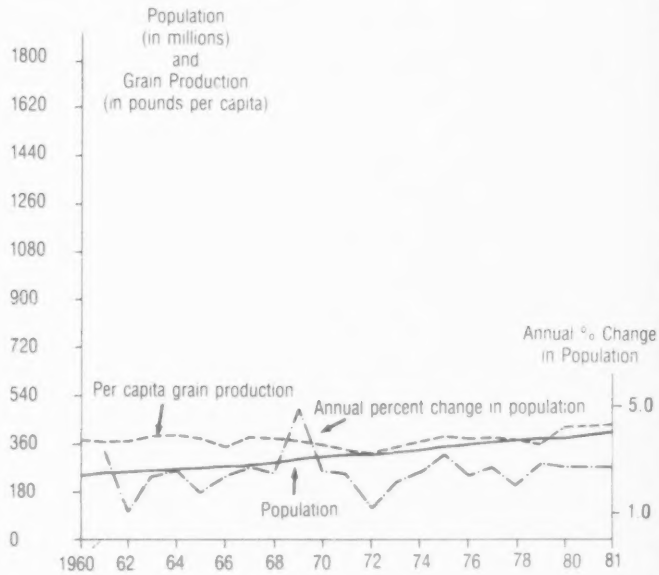
Centrally Planned Economies



Rapidly and Moderately Developing Nations



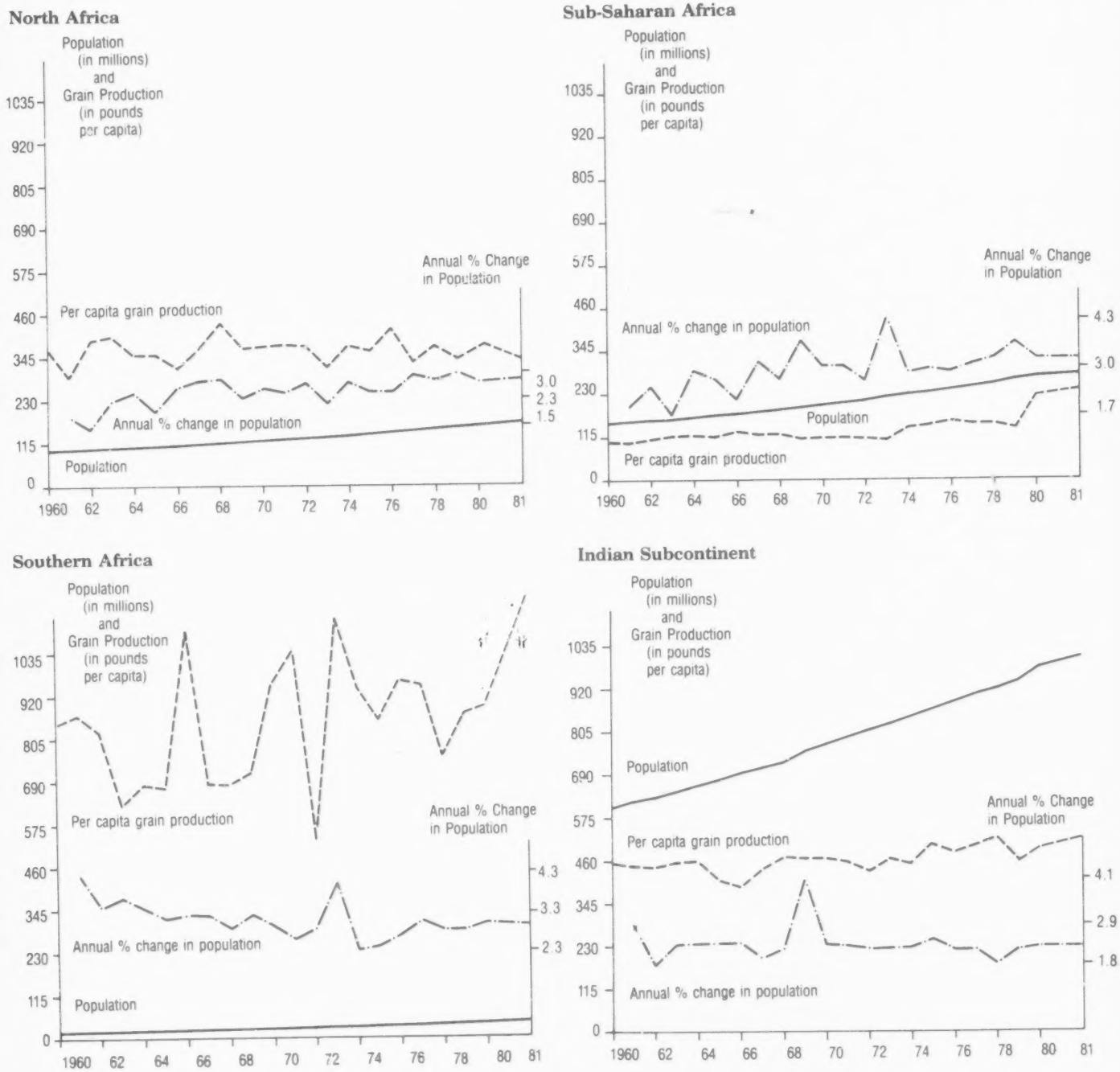
Other Developing Nations



Appendix I, Figure 1. Trend in Population, Population Growth Rates and Per Capita Grain Production by Economic Groupings of Nations, 1960-81.

Note: Unusual yearly fluctuations in the population growth rates are due to data limitations in population series for developing nations.

Source: Food and Agricultural Organization of the United Nations, *Production Yearbook, 1981* (Rome, Italy), 1981 and U.S. Department of Commerce, Bureau of Census, *International Population Dynamics, 1950-80, Demographic Estimates for Countries with a Population of 5 Million or More*, (Washington, D.C.), 1981.

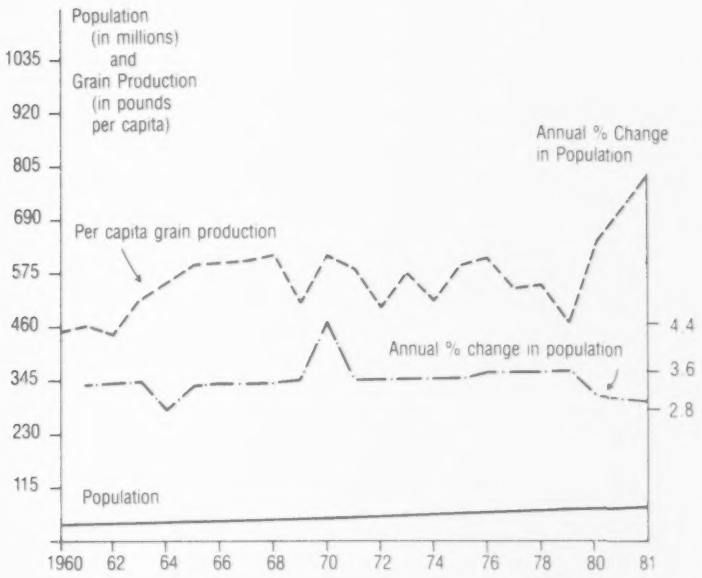


Appendix I, Figure 2. Trends in Population, Population Growth Rates and Per Capita Grain Production in Selected Areas of Africa and the Indian Subcontinent, 1960-81.

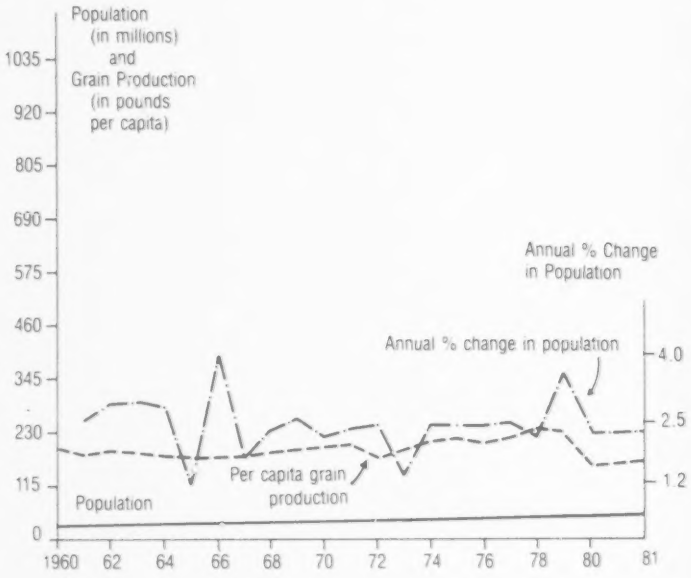
Note: Unusual yearly fluctuations in the population growth rates are due to data limitations in population series for developing countries.

Source: Food and Agricultural Organization of the United Nations, *Production Yearbook, 1981* (Rome, Italy), 1981 and U.S. Department of Commerce, Bureau of Census, *International Population Dynamics, 1950-80, Demographic Estimates for Countries with a Population of 5 Million or More*, (Washington, D.C.), 1981.

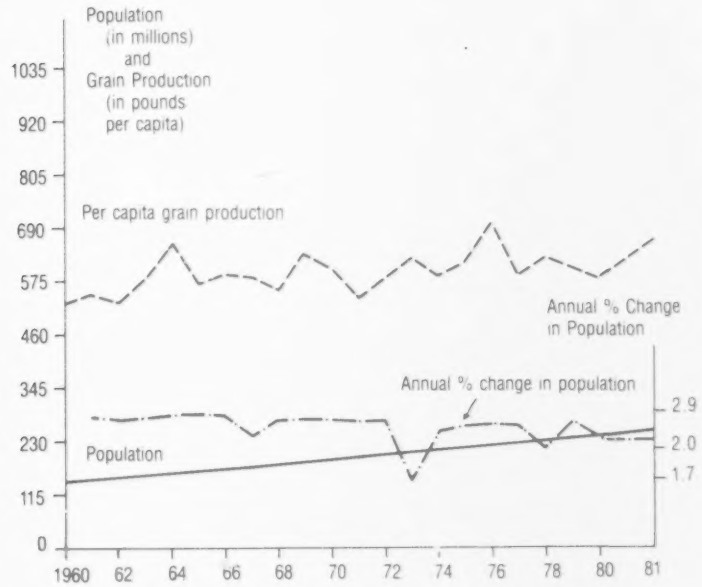
Mexico



Central America



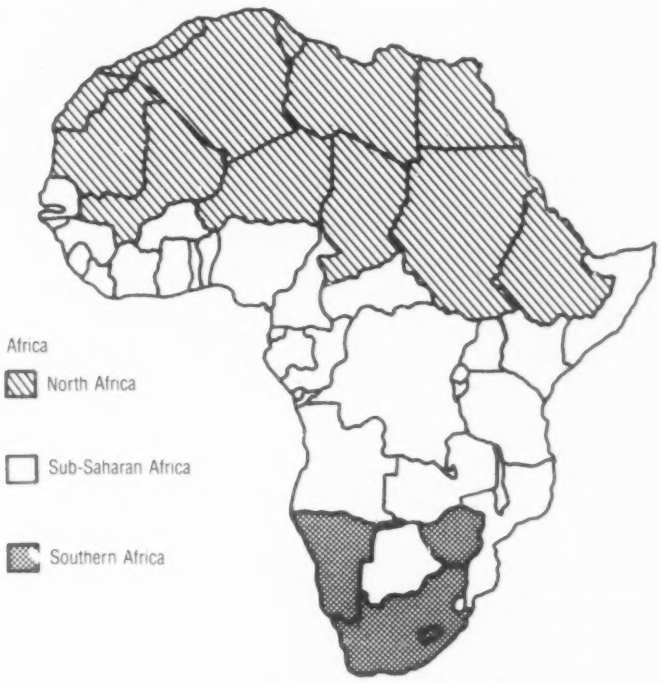
South America



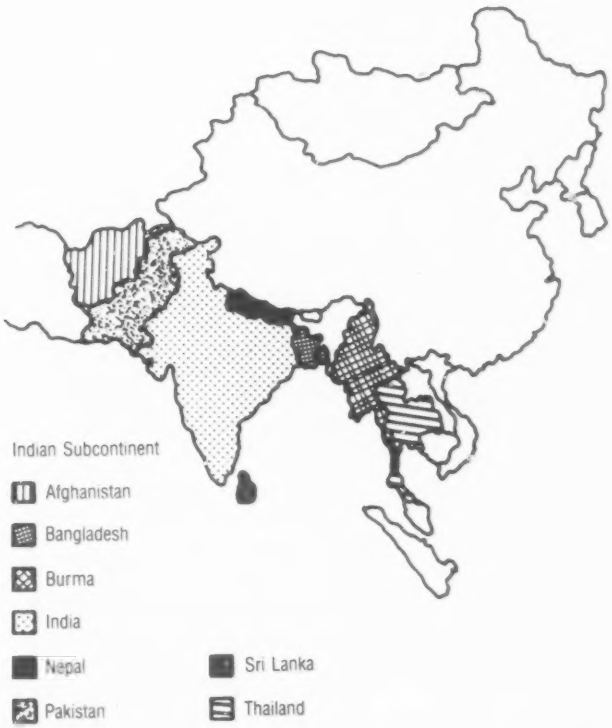
Appendix I, Figure 3. Trends in Population, Population Growth Rates and Per Capita Production in Selected Areas of Latin America, 1960-81.

Note: Unusual yearly fluctuations in the population growth rates are due to data limitations in population series for developing nations.

Source: Food and Agricultural Organization of the United Nations, *Production Yearbook, 1981* (Rome, Italy), 1981 and U.S. Department of Commerce, Bureau of Census, *International Population Dynamics, 1950-80, Demographic Estimates for Countries with a Population of 5 Million or More*, (Washington, D.C.), 1981.

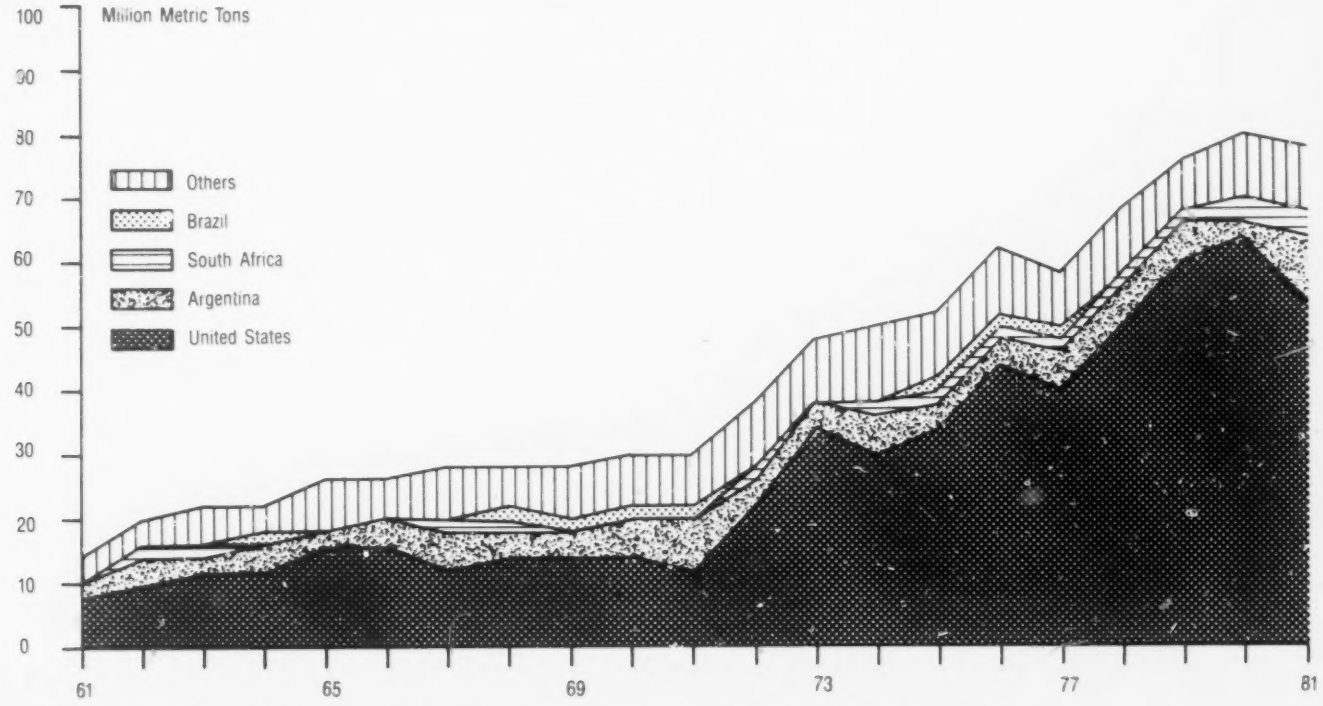


Appendix I, Map 1. Geographic Divisions for Africa.



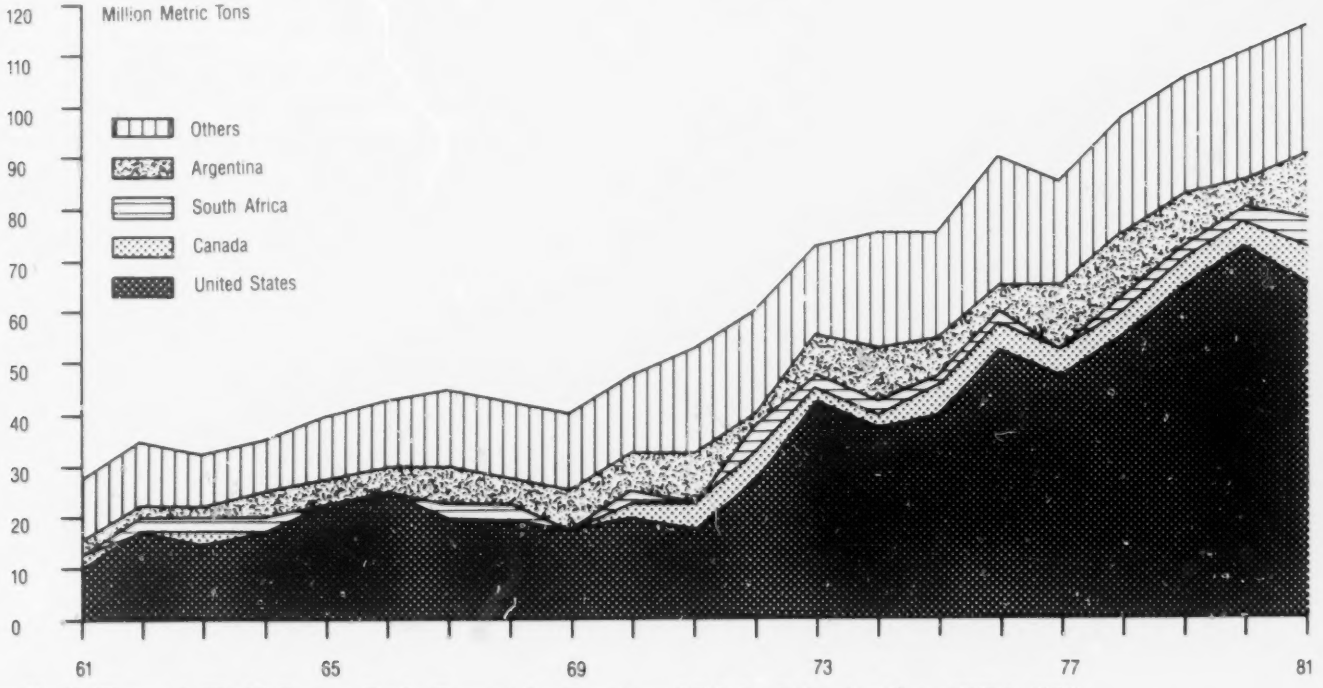
Appendix I, Map 2. Countries in the Indian Subcontinent.

Appendix II. World Grain, Soybean and Soybean Product Exports by Country of Origin, 1961-81



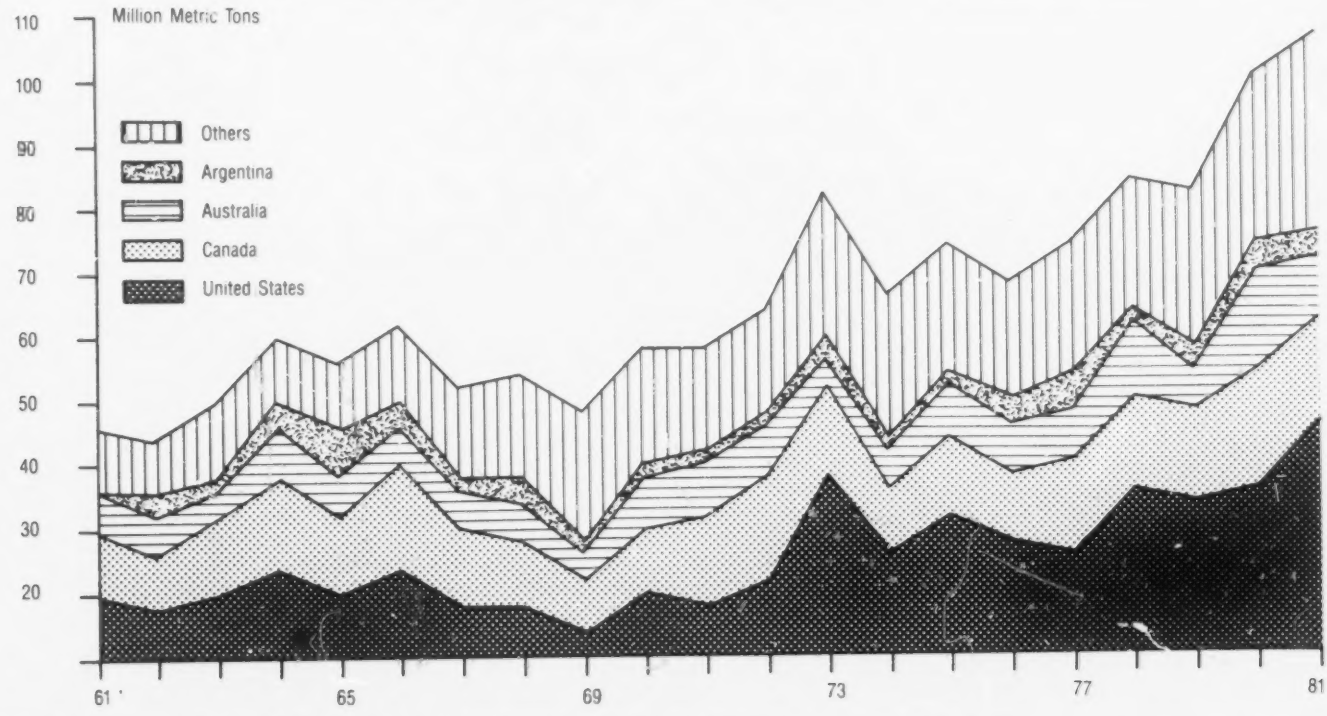
Appendix II, Figure 1. World Corn Exports by Country of Origin, Calendar Years 1961 to 1981.

Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook*, Various Issues, (Rome, Italy).



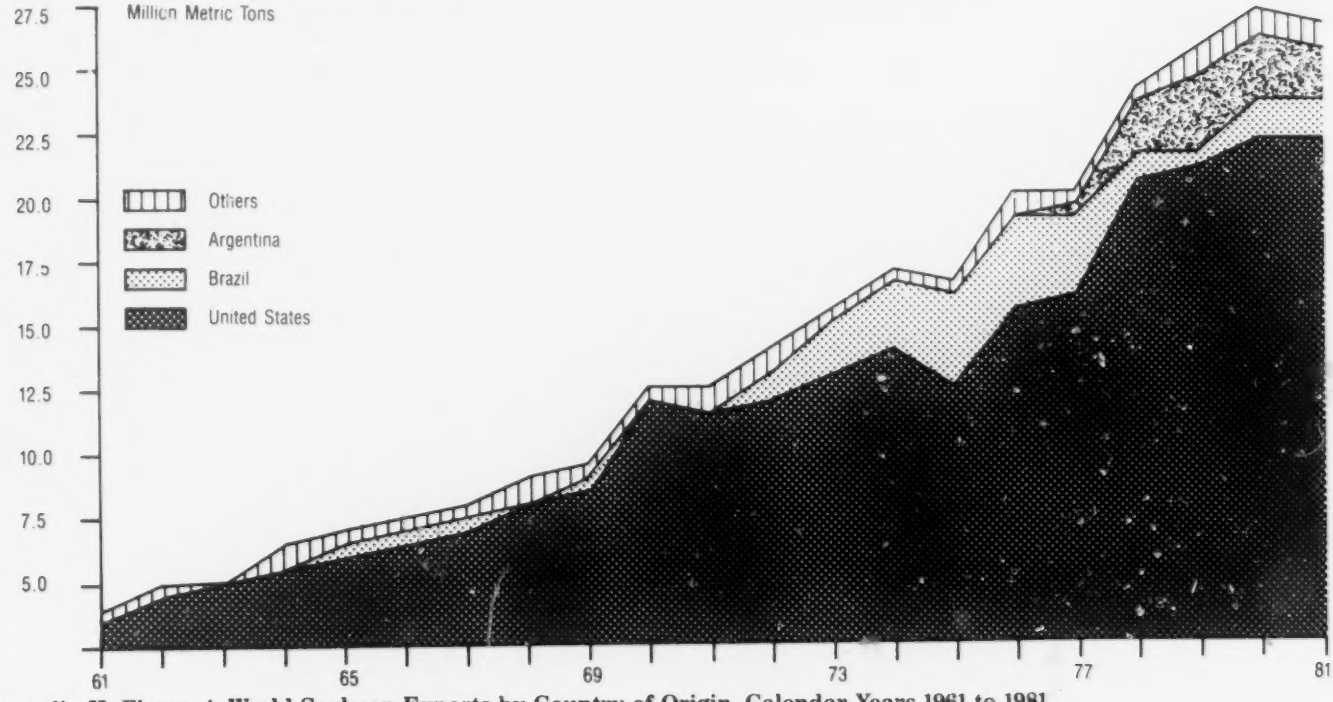
Appendix II, Figure 2. World Coarse Grain Exports by Country of Origin, Calendar Years 1961 to 1981.

Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook*, Various Issues, (Rome, Italy).



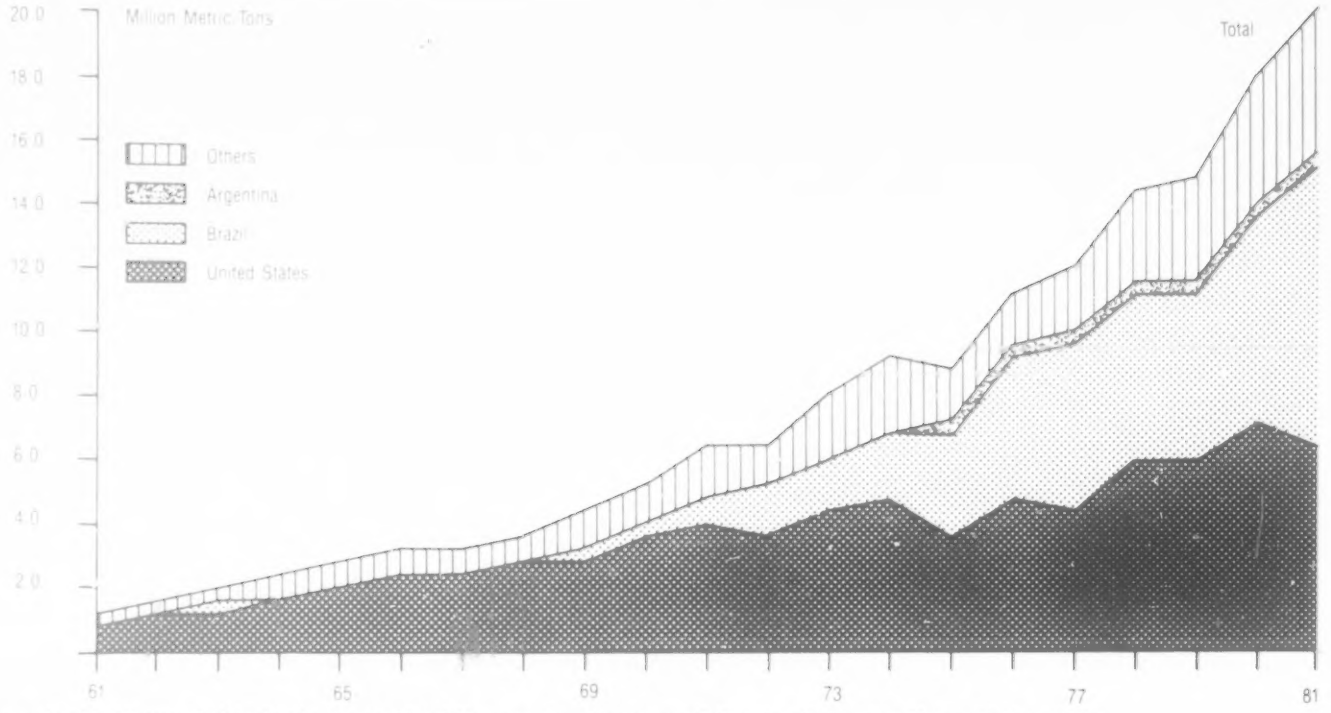
Appendix II, Figure 3. World Wheat Exports by Country of Origin, Calendar Years 1961 to 1981.

Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook*, Various Issues, (Rome, Italy).

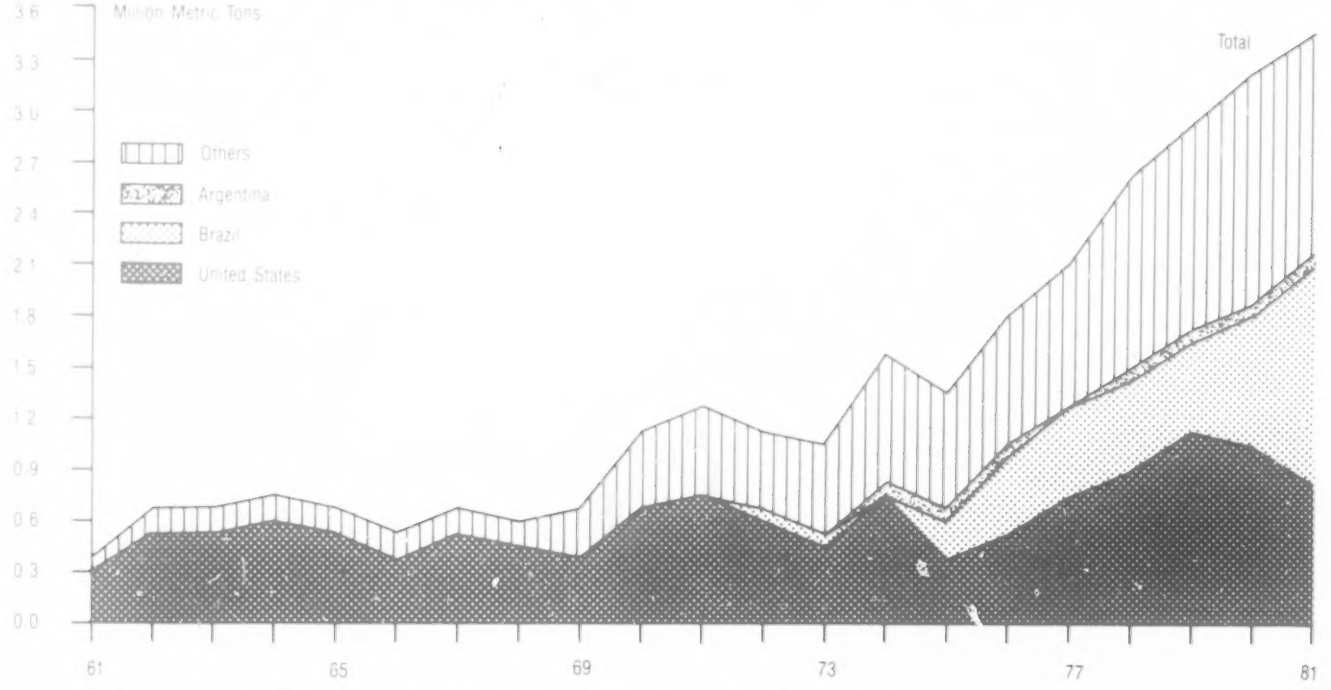


Appendix II, Figure 4. World Soybean Exports by Country of Origin, Calendar Years 1961 to 1981.

Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook*, Various Issues, (Rome, Italy).



Appendix II, Figure 5. World Soybean Meal Exports by Country of Origin, Calendar Years 1961 to 1981.
Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook*, Various Issues, (Rome, Italy).



Appendix II, Figure 6. World Soybean Oil Exports by Country of Origin, Calendar Years 1961 to 1981.
Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook*, Various Issues, (Rome, Italy).

Appendix III. Maps and Table Showing Destinations and Ports of U.S. Grain Exports in 1971-72 and 1981-82

Appendix III, Table 1. U.S. Grain and Soybean Exports in Thousands of Metric Tons by Port Areas, October-September 1971-72 and 1981-82.[a]

Commodity	Fiscal-Year	St. Lawrence Seaway & Lakes	Atlantic	Gulf	Pacific	Interior	Total
Corn	1981-82	3,270.32	9,894.78	33,435.81	3,364.81	15.52	49,981.24
	1971-72	3,535.34	3,291.90	12,690.58	14.10	0	19,531.92
Wheat	1981-82	3,101.05	2,934.35	26,159.12	12,125.35	49.20	44,369.07
	1971-72	2,346.70	515.33	8,372.80	6,242.69	0	17,477.52
Soybeans	1981-82	1,406.63	2,407.65	20,595.40	765.17	60.73	25,235.58
	1971-72	2,068.03	689.29	8,099.50	0	0	10,856.82

[a]Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), various issues; *Grain and Feed Market News* (Independence, Missouri), various issues; and U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products* (Washington, D.C.), various issues.

Appendix III. Map 1. Flow Pattern of U.S. Corn Exports to Major Foreign Destinations in 1971-72.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), various issues.

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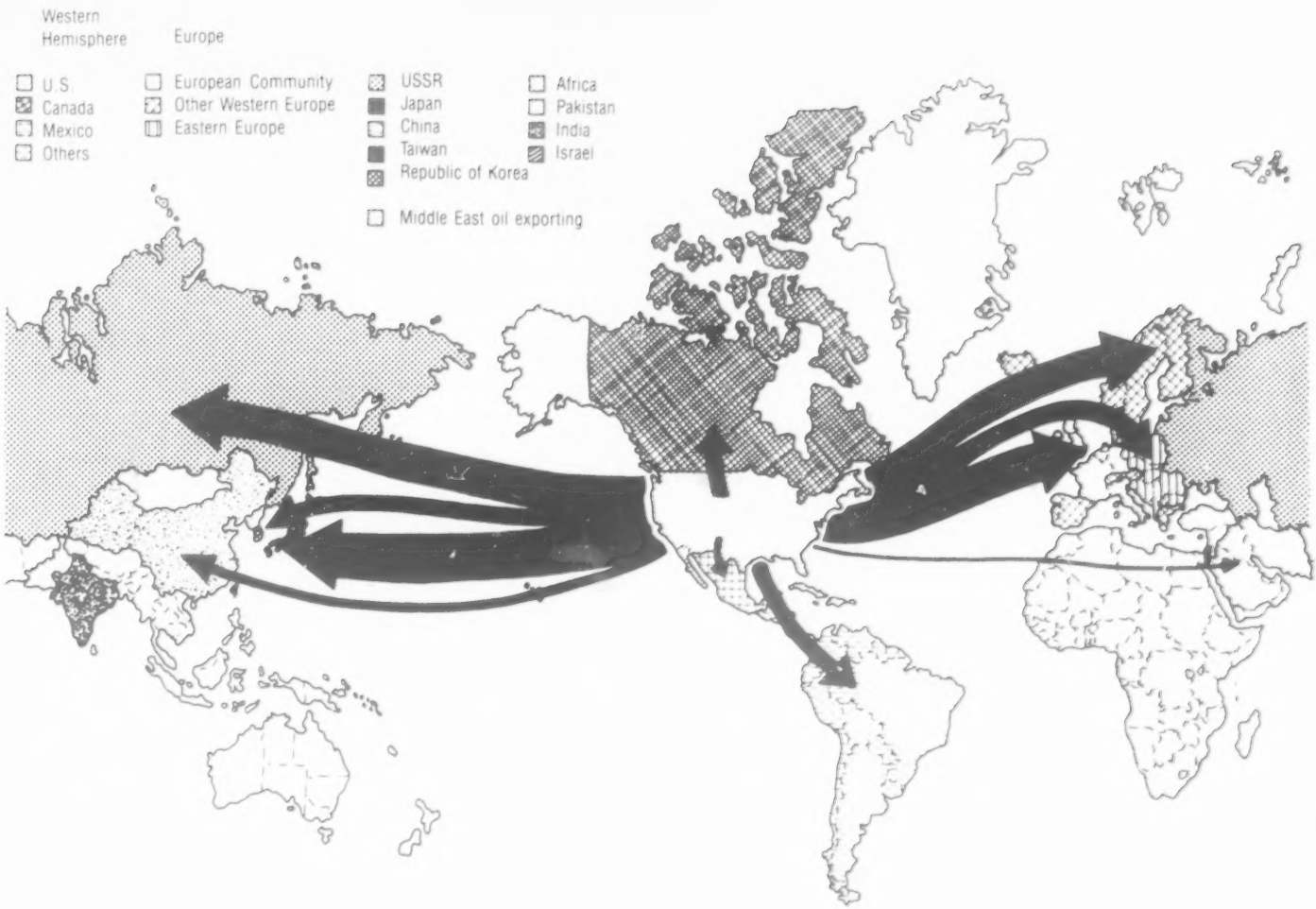

Appendix III. Map 2. Flow Pattern of U.S. Corn Exports to Major Foreign Destinations in 1981-82.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), various issues.

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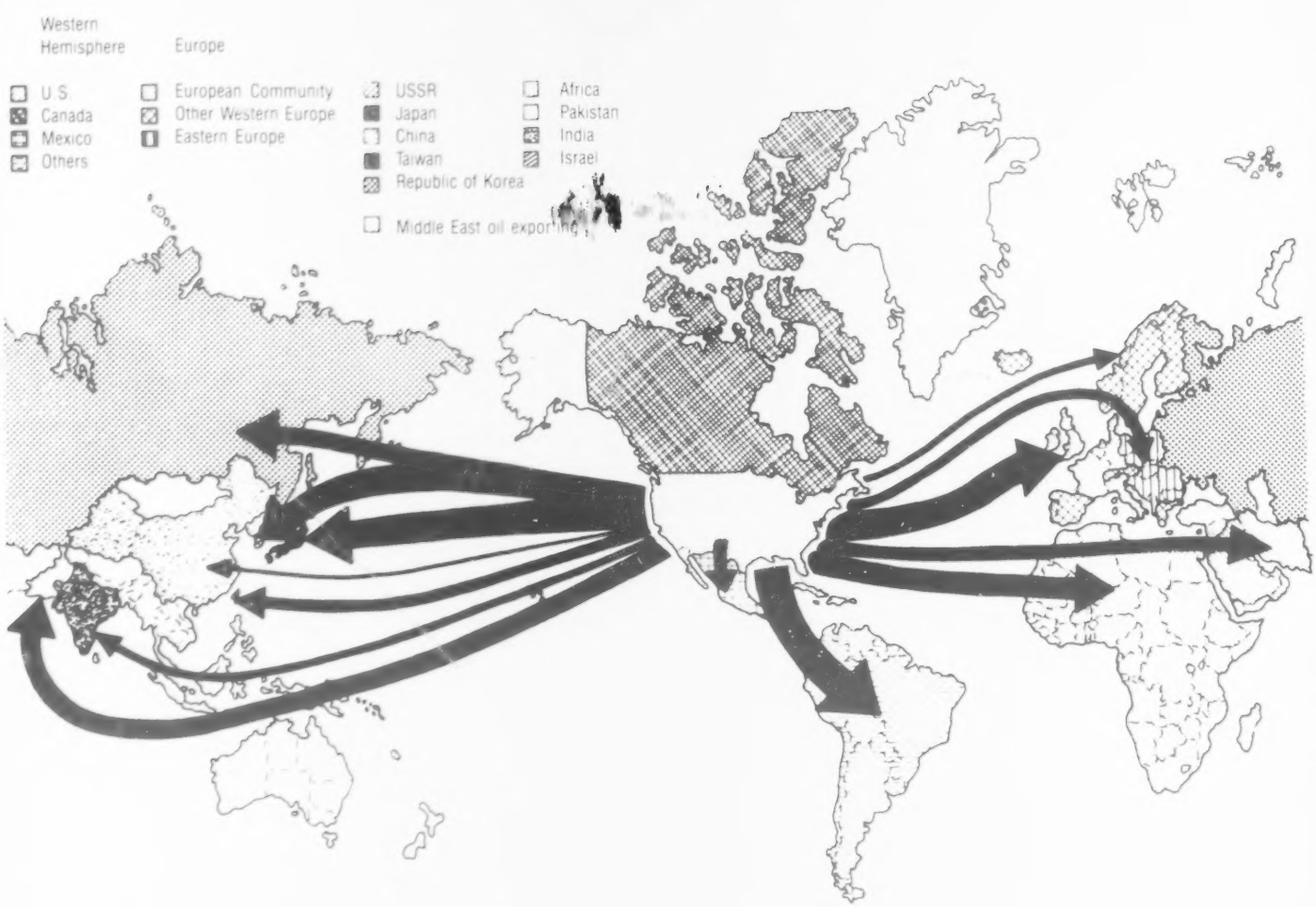

Appendix III. Map 3. Flow Pattern of U.S. Wheat Exports to Major Foreign Destinations in 1971-72.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), various issues.

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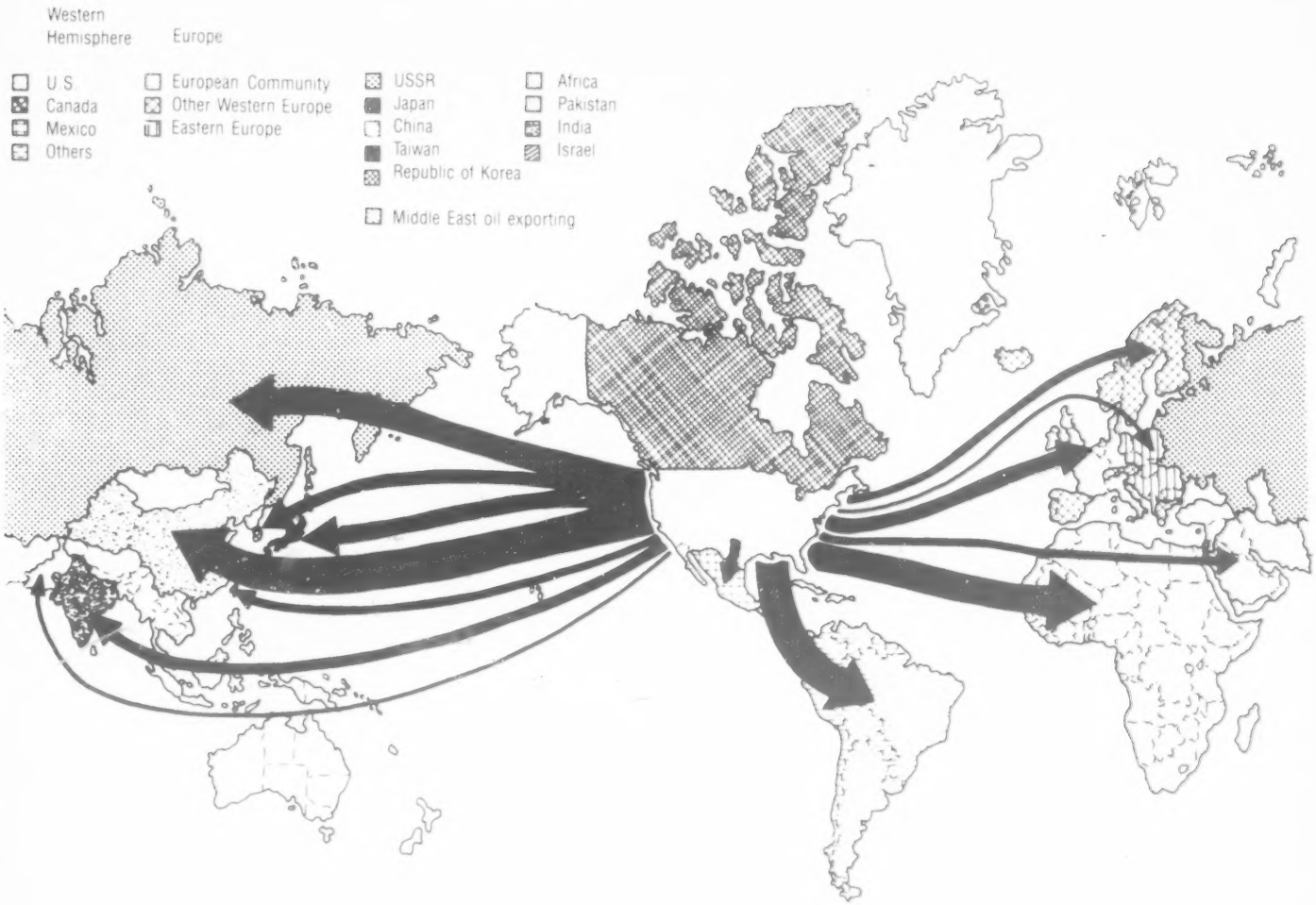

Appendix III. Map 4. Flow Pattern of U.S. Wheat Exports to Major Foreign Destinations in 1981-82.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), various issues.

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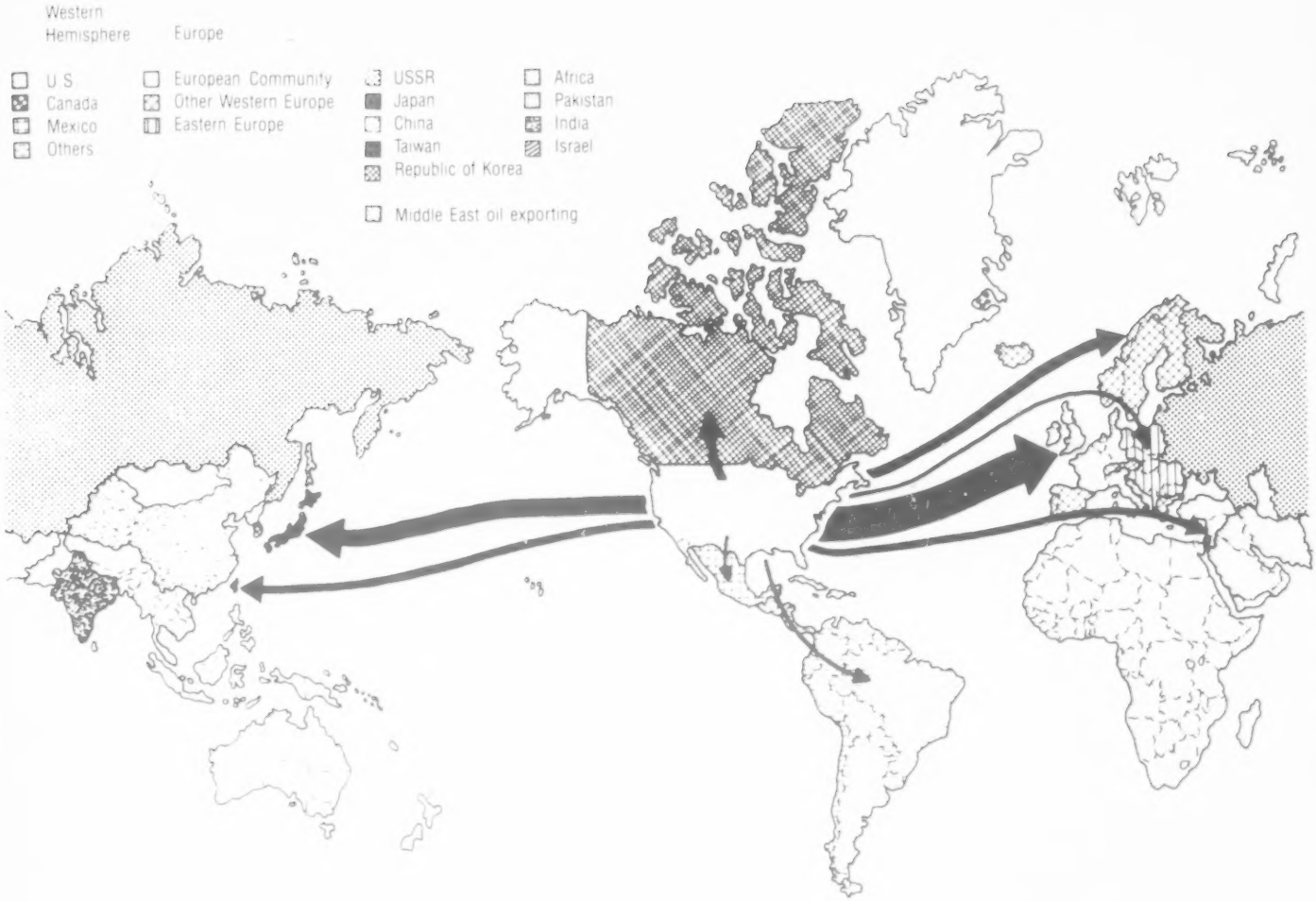

Appendix III. Map 5. Flow Pattern of U.S. Soybean Exports to Major Foreign Destinations in 1971-72.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), various issues.

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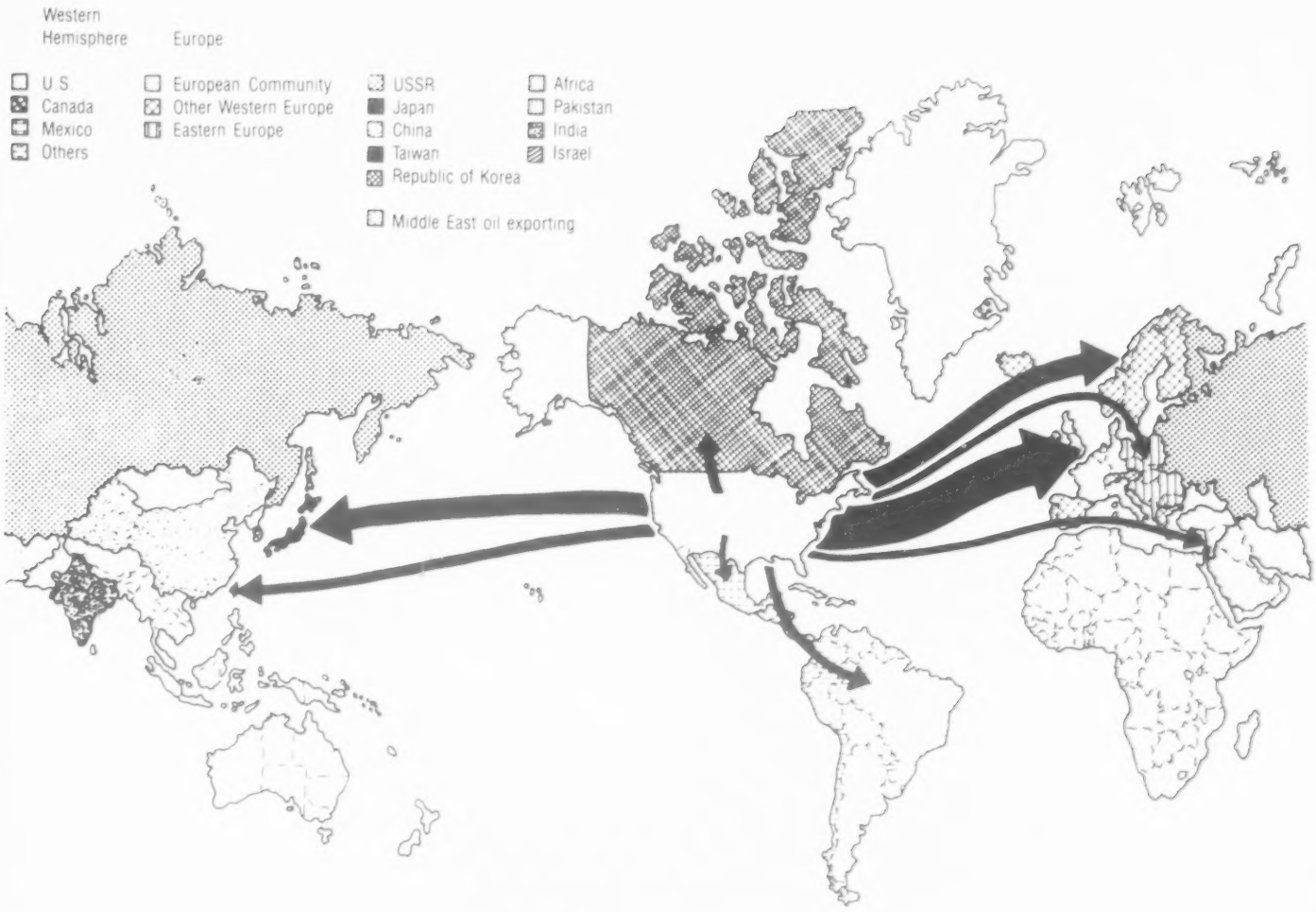

Appendix III. Map 6. Flow Pattern of U.S. Soybean Exports to Major Foreign Destinations in 1981-82.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), various issues.

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Appendix IV. Maps Showing Sources of U.S. Pork and Beef Imports

Appendix IV. Map 1. Flow Pattern of U.S. Beef and Veal Imports from Major Foreign Origins in 1981-82.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November-December 1982.

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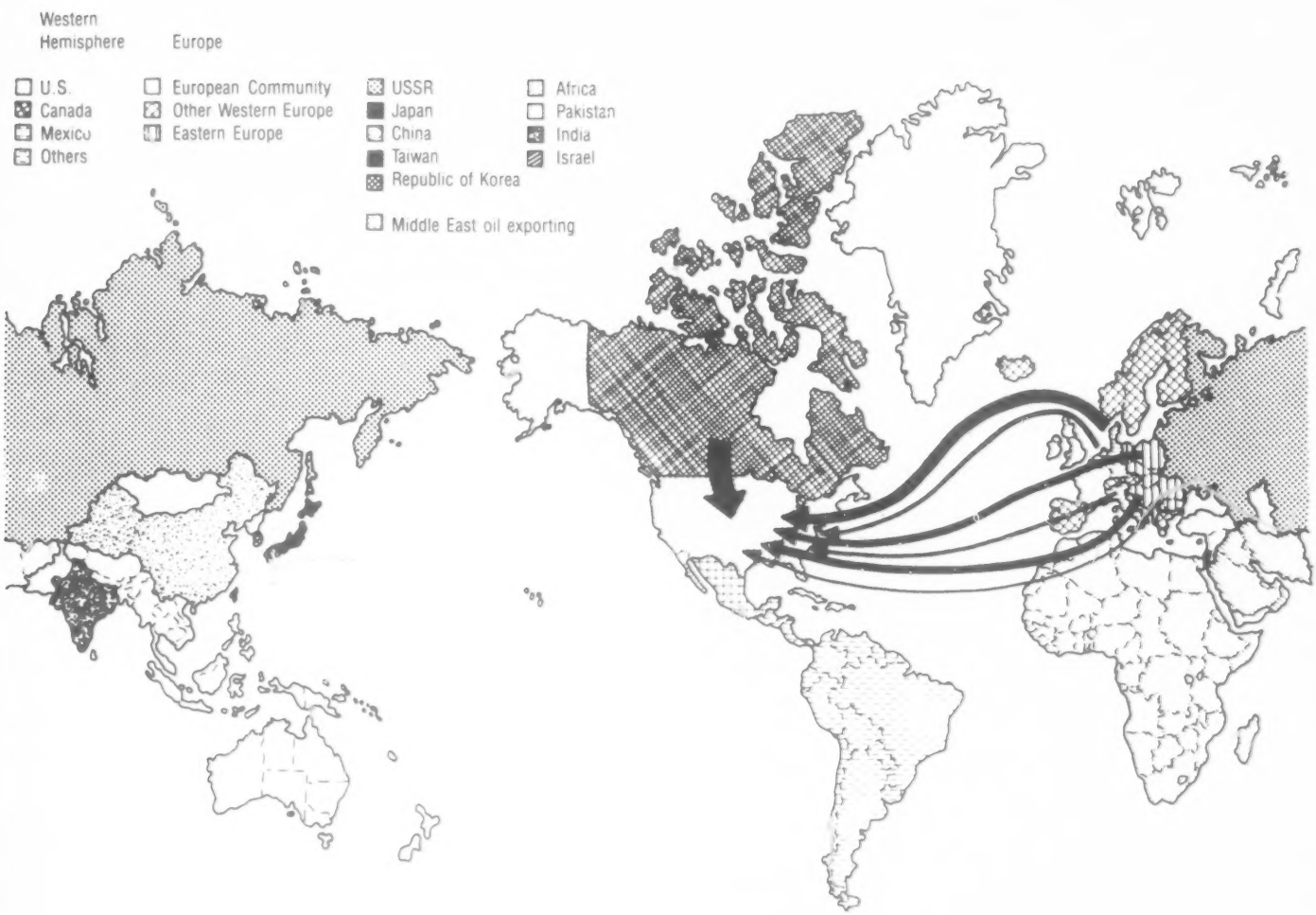

Appendix IV. Map 2. Flow Pattern of U.S. Pork Imports from Major Foreign Origins in 1981-82.

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November-December 1982.

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Appendix V. U.S. Concessional Farm Product Exports by Commodities and Program Areas, 1977-82 Fiscal Years

Appendix V, Table 1. U.S. Concessional Government-Financed Agricultural Exports by Commodities and Program Areas in Millions of Dollars, Fiscal Years 1977 Through 1982.[a]

Commodity and Fiscal Year (October-September)	PL-480 Title I Long Term Credit Sales	PL-480 Title II[b] Donations	Aid Mutual Security	Total[c] Government Programs	Concessional Government Exports as Percent of Total Exports
1982 Wheat and Flour	497.6	69.3	0	567.0	7.4
Corn	36.1	9.0	38.9	83.9	1.4
Soybean Oil	75.8	60.3	1.9	138.0	27.7
Cotton (exc. Linters)	9.2	0	0	9.2	.4
Milk-Nonfat dry	0	11.2	0	11.2	27.3
Others	103.6	135.4	41.5	280.5	1.2
1981 Wheat and Flour	495.1	83.0	0	578.0	7.2
Corn	78.3	30.9	57.0	166.3	2.1
Soybean Oil	73.3	96.6	0	169.9	38.5
Cotton	3.2	0	0	3.2	.1
Milk-Nonfat Dry	0	34.5	0	34.5	58.7
Others	123.0	241.3	84.3	449.1	1.8
1980 Wheat and Flour	531.5	87.6	11.5	630.5	9.6
Corn	88.0	31.4	28.5	147.8	1.9
Soybean Oil	62.8	109.4	0	172.2	22.0
Cotton	12.3	0	0	12.3	.4
Milk-Nonfat Dry	0	22.7	0	22.7	53.4
Others	164.8	225.4	142.8	533.0	2.4
1979 Wheat and Flour	542.1	76.2	1.0	619.3	13.0
Corn	63.5	12.5	146.8	222.8	3.7
Soybean Oil	34.4	85.5	1.8	121.8	17.3
Cotton	18.4	0	0	18.4	1.0
Milk-Nonfat Dry	0	22.8	0	22.8	83.4
Others	134.3	196.1	154.5	485.0	2.6

Appendix V, Table 1. (Continued) U.S. Concessional Government-Financed Agricultural Exports by Commodities and Program Areas in Millions of Dollars, Fiscal Years 1977 Through 1982.[a]

Commodity and Fiscal Year (October-September)	PL-480 Title I Long Term Credit Sales	PL-480 Title II[b] Donations	Aid Mutual Security	Total[c] Government Programs	Concessional Government Exports as Percent of Total Exports
1978 Wheat and Flour	430.6	69.0	42.0	541.6	14.8
Corn	40.8	17.3	140.5[d]	198.6	3.7
Soybean Oil	94.8[e]	34.2	77.0	206.0	29.1
Cotton	10.0	0	0	10.0	.6
Milk-Nonfat Dry	0	33.5	0	33.5	43.2
Others	162.6	181.0	215.5	559.1	3.6
1977 Wheat and Flour	386.9	82.4	57.0	526.3	17.5
Corn	44.8	5.5	142.3[d]	192.6	2.5
Soybean Oil	69.3[e]	23.9	31.0	124.2	22.0
Cotton	18.0	0	0	18.0	1.2
Milk-Nonfat Dry	0	81.5	0	81.5	99.8
Others	240.8	148.7	188.7	578.2	4.2

[a]Source: U.S. Department of Agriculture, Economic Research, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January-February 1983; and various other issues.

[b]Donations include voluntary relief agencies, The World Food Program, and Government-to-Government donations.

[c]May not add due to rounding.

[d]Mutual Security shipments estimated from the relationship between corn and feed grain exports.

[e]Title I shipments estimated from the relationship between soybean oil and soybean and cottonseed oil exports.